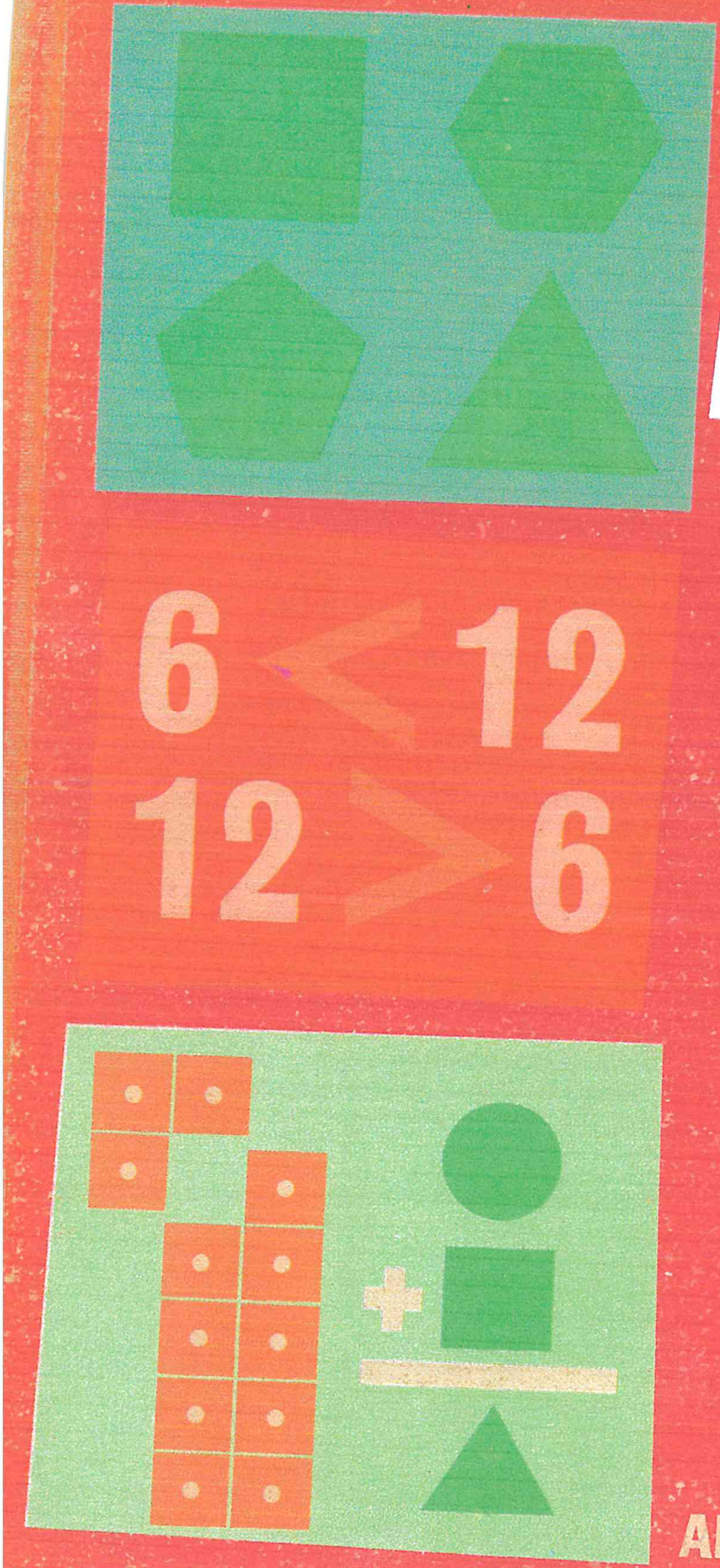
EXPLORING MATHEMATICS



ABC MATHEMATICS

A NOTE FROM THE PUBLISHER

The annotated Teacher's Edition is designed to give the greatest possible help to teachers of primary mathematics. It contains these distinctive features:

PUPIL'S BOOK—the complete text

TEACHER'S GUIDE—detailed analysis of lessons with discussion of objectives, teaching suggestions, and step-by-step presentation of new concepts (guide pages G1-104)

ACTIVITIES—to build readiness and provide help for individual reteaching, study, or drill (sections A-K on guide pages G105-123)

OVERPRINT IN COLOR—listing for each lesson:

- **Aims** with references to guide pages (G1-104)
- **Activities** suggested to precede lesson, with references to sections A-K (guide pages G105-123)
- **Procedures** for each text page giving highlights from the teaching suggestions
- **Answers** for exercises
- **Follow-up** notes on additional exercises or further use of activities in sections A-K (guide pages G105-123)
- **Vocabulary** providing for introduction of mathematical terms as needed and indicating by underlining some other words which may not be familiar to the children

MEANINGS OF MATHEMATICAL TERMS—with brief explanations of modern mathematical terms for the teacher's own information (guide pages MI-15)

FILMSTRIPS—Modern Mathematics Filmstrips, filmstrips for use with this textbook, are available from Audio Education, Inc. The authors of the textbook were consultants in the preparation of these filmstrips.

LABORATORY APPROACH—Three-dimensional, or manipulative, materials that are helpful in the development and maintenance of mathematical concepts contained in this series have been produced by The Learning Center, Princeton, New Jersey. These materials with teaching guides also are available from American Book Company.

The Modern Mathematics Series

EXPLORING MATHEMATICS

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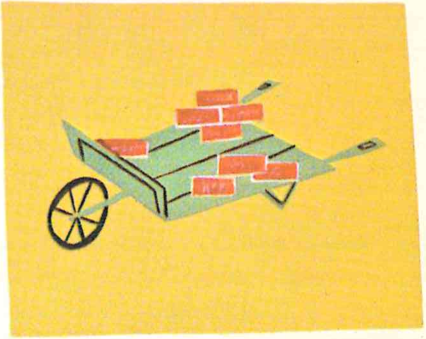
Robert B. Kane
Robert A. Oesterle



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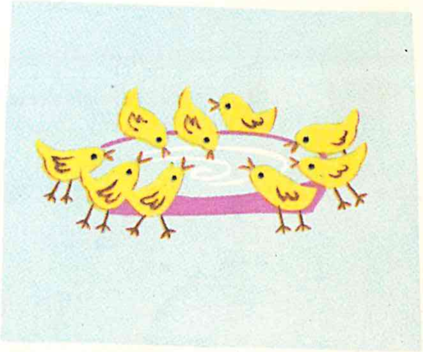

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1 3 5 7 9 11 13 15 RRD 16 14 12 10 8 6 4 2

TEACHER'S EDITION – ANNOTATED AND KEYED

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1 3 5 7 9 RRD 10 8 6 4 2

CONTENTS

		Page
Chapter 1	Number facts for 8-11; working with sets; number facts in problems; feet and yards; adding three numbers; column and horizontal addition; using 5's and 10's; "teen" numbers; odd and even numbers; adding and subtracting by endings.	1
Chapter 2	Number facts for 9-12; missing numbers; comparing subsets; the calendar; ordinal numbers; reading and writing numerals through 150; adding and subtracting 10's; place value; doubles of 4, 5, and 6.	22
Chapter 3	Number facts for 10-13; adding and subtracting zero and one; following directions in problem solving; number lines; successive addition and subtraction; geometrical shapes; readiness for square measure; problem solving; missing data.	42
Chapter 4	Number facts for 11-14; literal numbers; successive addition including zeros; adding and subtracting 2-digit numbers; difference; associative property; money; inequalities; weight in pounds.	62
Chapter 5	Number facts for 12-15; sets and subsets; problem solving; doubles of 5, 6, 7; numerals and number words; 2-digit numbers and 3-digit sums; multiplication and division facts for 5 and 10.	83

Chapter 6 104

Number facts for 13-16; commutative property; liquid measure; halves and fourths; using 10; equal sets; relationships: 2's, 4's, 8's, and 3's, 6's, 9's; inches, feet, and yards; greater than, less than concept.

Chapter 7 126

Number facts for 15-18; other names for numbers; fractional parts; adding and subtracting 2-digit numbers with sums in other decades; telling time; problem analysis.

Chapter 8 147

Sets and number facts; ordinals; reading and writing numerals to 200; number sentences for problems; multiplication and division facts.

End-Of-Year Tests 172

Practice Section 175

Index 187

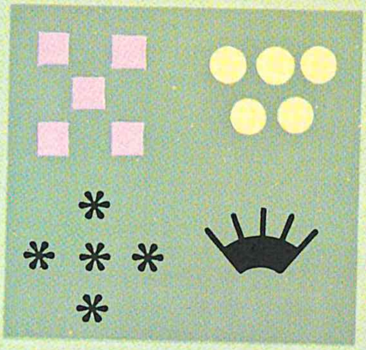
TO THE TEACHER

EXPLORING MATHEMATICS is planned for guided, developmental work with children. Detailed analysis of each lesson is provided in the TEACHER'S EDITION which gives background for the teacher, introductory activities, a variety of ways to present difficult concepts, follow-up-materials, and answers.

(G1) AIMS: Stimulate pupils' interest in their mathematics book; suggest areas they will explore this year; review or develop orally any unfamiliar words.

PROCEDURES: Read or have a child read legends under pictures. Guide pupils to identify the shapes. "What is in each picture?"

WHAT WILL YOU LEARN?



"How many in each set?"

"Think of other sets of 5 objects."

You will learn about sets.

"Who knows answers for these facts? In which did you add? subtract?"

$4 + 3 = \boxed{7}$

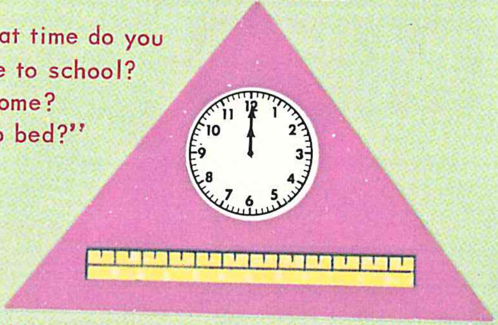
$2 + \boxed{4} = 6$

$5 - 2 = \boxed{3}$

$4 - \boxed{1} = 3$

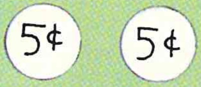
You will learn to add and subtract.

"What time do you come to school? go home? go to bed?"



"Could we measure how tall you are?"

You will learn to tell time; to measure.



You have 5¢.

You get 5¢ more. How much money do you have?

5¢ + 5¢ = ☐

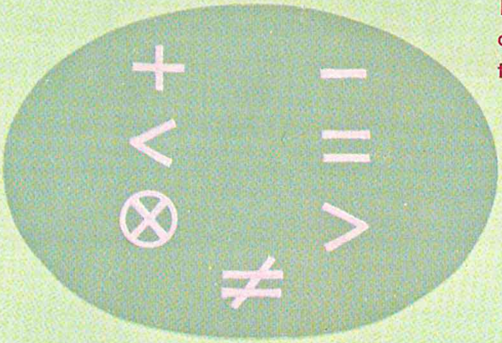
3¢ + 2¢ = ☐

4¢ + 1¢ = ☐

5¢ + 3¢ = ☐

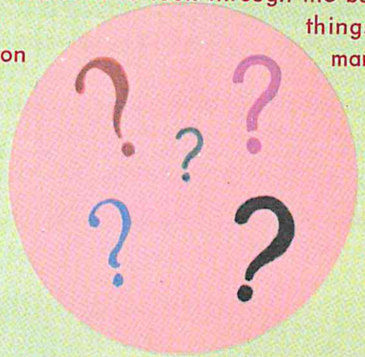
"Think of another story about 10¢."

You will learn to solve problems.



You will learn many signs.

Encourage children to look through the book to discover new things to replace the question marks.



You might call attention to pp. 27, 44, 46, 61, 78, 149. Help pupils locate the pages.

Look for some other things.

FOLLOW-UP: See if pupils can locate some of the signs on text pages.

(G1–3) AIMS: Explore sets of 8–11 objects; discover addition, subtraction, multiplication and division facts for these numbers.

ACTIVITIES: A1, 2, 3, 6, 7, 8; B1, 2, 3, 4 (G105)

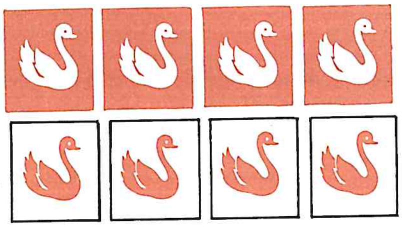
SETS OF 8 THROUGH 11

PROCEDURES: Discuss what floors are made of. (wood, linoleum, tiles) Determine number of tiles in each exercise. Explore sets with markers. Guide pupils to separate sets into subsets. Discuss how they see the sets and subsets and different ways of combining to arrive at the total with a minimum of counting.

How many picture tiles in each set?
How do you know? Tell about each set.
Show subsets of each set.

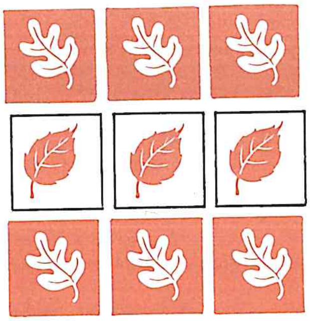
1.

"Cover 2; cover 2 more. How many left? Cover 6. How many left? What other facts can you show?"



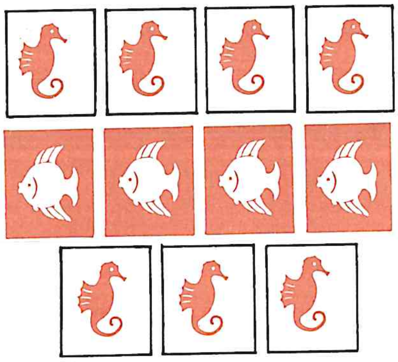
Record on the chalkboard all facts discovered, for future use.

2.

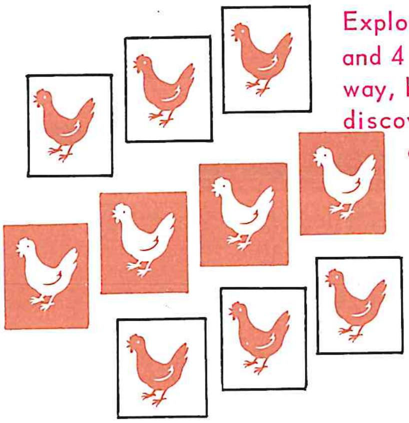


"How many sets of 3? 3 and 3 more are how many? and 3 more? Show 7. How many are needed to make 9?"

3.



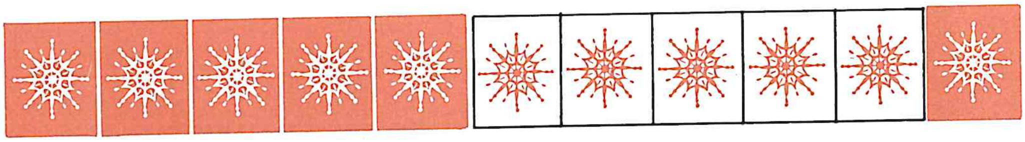
4.



Explore sets in Ex. 3 and 4 in the same way, having children discover all possible combinations.

Use the picture line in Ex. 5 to have pupils rediscover the facts for 8–11. Guide them to move to the right when putting tiles together and to the left when separating or finding missing numbers of tiles.

5.



Continue on page 3.

Using the pictures on the opposite page as they need them, pupils are to find answers to these exercises. They may write the answers or you may work with the group orally. Encourage adding on to the largest set they can recognize.

Use the pictures to help you find answers.

6. $8 = 3 + \boxed{5}$
$10 = 4 + \boxed{6}$
$9 = 2 + \boxed{7}$
$11 = 2 + \boxed{9}$
$10 = 3 + \boxed{7}$
$9 = 6 + \boxed{3}$

7. $11 = 4 + \boxed{7}$
$8 = 6 + \boxed{2}$
$9 = 5 + \boxed{4}$
$11 = 6 + \boxed{5}$
$9 = 1 + \boxed{8}$
$11 = 3 + \boxed{8}$

Using the pictures on the opposite page, have the pupils find the set that contains the correct number of elements.

8. $9 - 7 = \boxed{2}$
$11 - 5 = \boxed{6}$
$8 - 5 = \boxed{3}$
$10 - 4 = \boxed{6}$
$11 - 3 = \boxed{8}$
$10 - 2 = \boxed{8}$

9. $11 - \boxed{7} = 4$
$10 - \boxed{3} = 7$
$9 - \boxed{6} = 3$
$8 - \boxed{2} = 6$
$11 - \boxed{9} = 2$
$11 - \boxed{4} = 7$

The children are to make each number sentence true in four ways. (10 = 7 + 3, 10 = 2 + 8) and so on. Some children will be able to think of many more than four ways.

10. Find four sets of numerals for each of these sentences.

10 = ■ + ●
9 = ■ + ●
11 = ■ + ●

Answers will vary. Help pupils achieve variety rather than repeating the pattern of answers.

11 − ▲ = ■
9 − ▲ = ■
10 − ▲ = ■

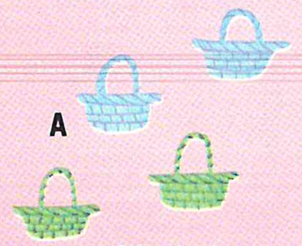
FOLLOW-UP: A4, 5 (G104)

(G3–4) AIMS: Interpret pictures in sequence; use facts in solving problems; work with comparisons, remainder, and number-needed ideas in subtraction.
ACTIVITIES: A8; B2, 3; C1, 2, 3, (G105)

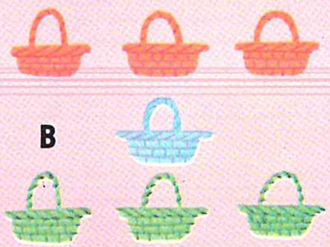
NUMBER FACTS IN PROBLEMS

PROCEDURES: Explain that Father and Billy built a flower box. The pictures tell number stories about filling the box. Discuss what is needed in a flower box. (See G 3)

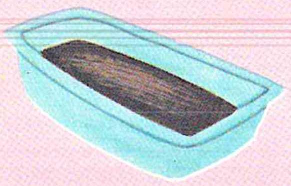
Tell the story of filling the flower box.



Billy's baskets

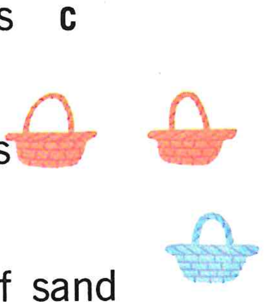


Father's baskets

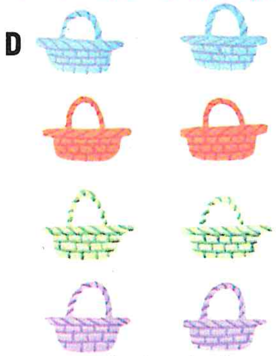


Use the pairs of pictures to demonstrate other facts for 9, 10, and 11.

1. How many baskets are in A and B?
2. How many baskets are in C and D?
3. How many cans of sand are in E and F?

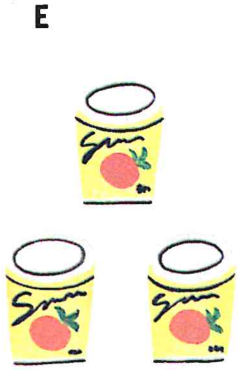


Joe's baskets

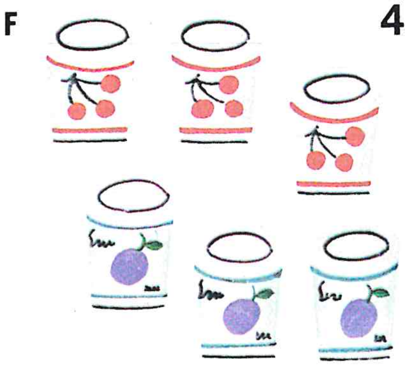


Tom's baskets

Have the pupils study the facts in Ex. 4 and find the pictures which tell the story. Have them write answers for the facts.



Joe's cans



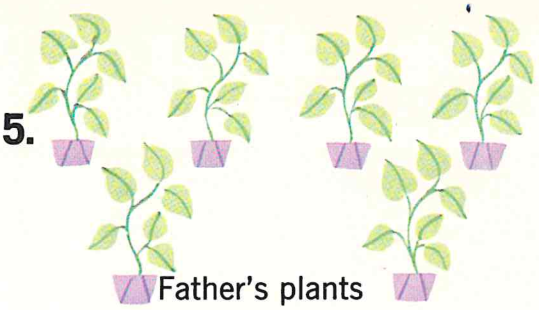
Tom's cans

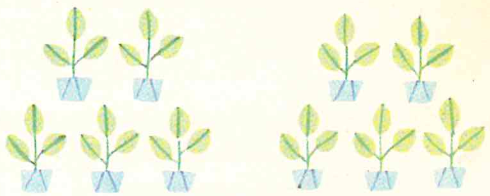
4. Find the answers.

4 + 7 = 11
3 + 6 = 9
3 + 8 = 11
7 + 4 = 11
6 + 3 = 9
8 + 3 = 11

Continue on page 5.

5.





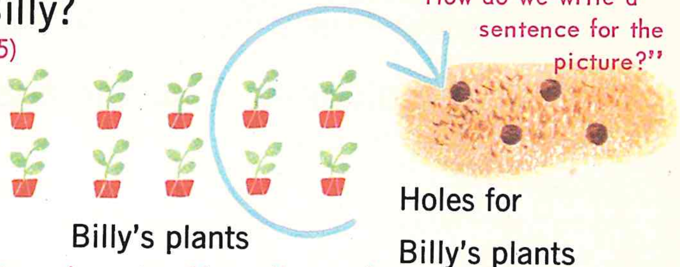
Explain that Father and the boys are now ready to plant flowers. They have some flowers in pots and some seedlings. (See G 4). "What does the arrow show? How do we write a sentence for the picture?"

How many plants has Father?

How many plants has Billy?

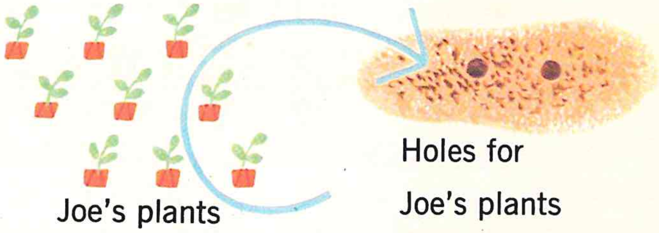
Help pupils recognize sets. (3 and 3) (5 and 5)

6. How many more holes does Billy need?

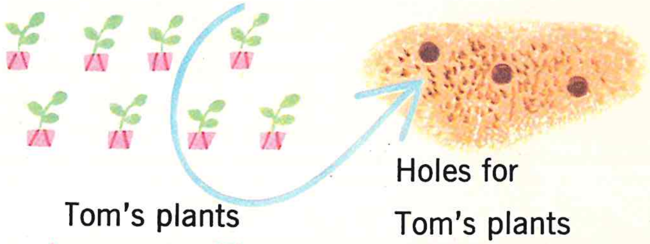


Develop also the inverse operation, or additive subtraction. You will not, of course, use the terms at this time. ($4 + \square = 10$ or $10 - 4 = \square$)

7. How many more holes does Joe need?



8. How many more holes does Tom need?



Have the pupils find a picture to go with each number sentence. They may write answers or give them orally.

9. $4 + \boxed{6} = 10$ $3 + \boxed{5} = 8$ $6 + \boxed{4} = 10$

$2 + \boxed{7} = 9$ $9 - 2 = \boxed{7}$ $6 + 5 = \boxed{11}$

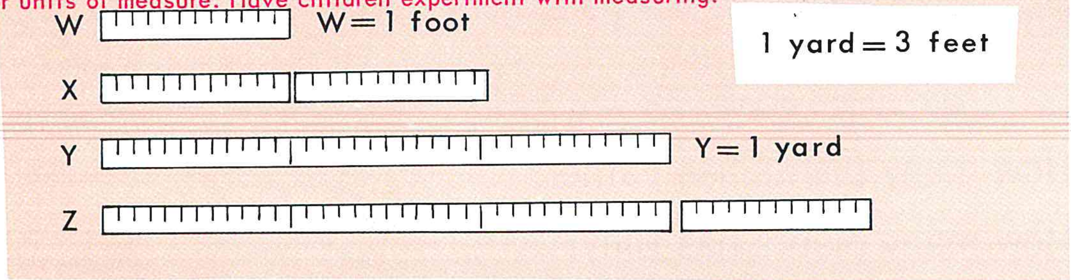
Note: See G3–4 for further development for this lesson.

FOLLOW-UP: Use Activities C1, 2, 3 (G113)

(G4–5) AIMS: Develop understanding of feet and yards. Match number sentences with problems. Solve problems.
ACTIVITIES: A1, 8; B2a, 3e, 7; D1, 2, 3; F1–6 (G105)

FEET AND YARDS

PROCEDURES: Introduce the words foot, feet, yard. Have pupils explore pictures and Ex. 1. Discuss need for units of measure. Have children experiment with measuring.



1. Use the pictures. Find the answers.

5 feet = Y + X
6 feet = X + Z
7 feet = Y + Z
5 feet = Y + W + W
8 feet = Z + Z
4 feet = Y + W
10 feet = Z + Y + Y
11 feet = Z + Z + Y
X = W + W = 2 feet
Z = Y + W = 4 feet

Accept any other combinations which give correct answers.

Read aloud the story of building the playhouse (G 4). Have pupils find number sentences in Ex. 2 to match the story problems. Let them solve the problems. See if they can retell parts of the story using the number sentences.

2. Tell stories for these sentences.

8 − 3 = 5
8 − 6 = 2
7 − 2 = 5
2 fours = 8

5 + 6 = 11
8 + 3 = 11
6 + 2 = 8
2 tens = 20

10 − 8 = 2
11 − 8 = 3
8 + 2 = 10
4 twos = 8

Use Ex. 3 with the counting of the shingles in the story.

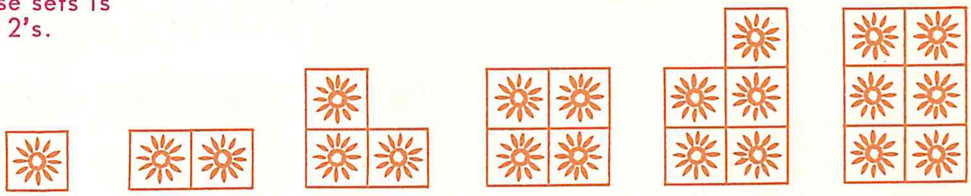
3. Study the rows. Write the missing numerals.

2 4 6 8 10 12
10 20 30 40
5 10 15 20 25

FOLLOW-UP: F1, 2, 3, 4, 5, 6 (G120)

(G5–7) AIMS: Learn about addition and subtraction facts through 11 using patterns based on 2.
ACTIVITIES: B3a through f (G108)
PROCEDURES: Explore the patterns across the top of this and the next page. Lead the class to discover that the pattern used in these sets is a pattern of 2's.

PATTERNS HELP YOU ADD



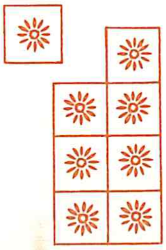
Look at the pictures. Can you see sets of twos?
Write the numeral for each picture.

Develop the terms odd and even using the patterns.

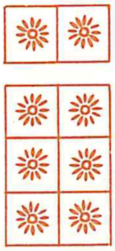
As facts are discovered, record them on the chalkboard for later review.

Find the answers.

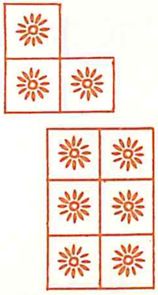
1.



①
+ $\boxed{7}$
8

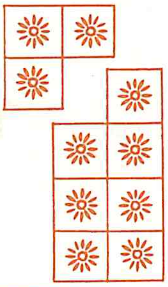


②
+ $\boxed{6}$
8

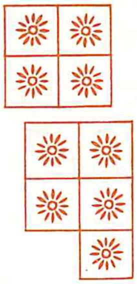


3
+ 6
9

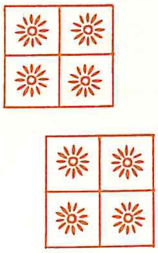
2.



3
+ 7
10



4
+ 5
9



4
+ 4
8

3.

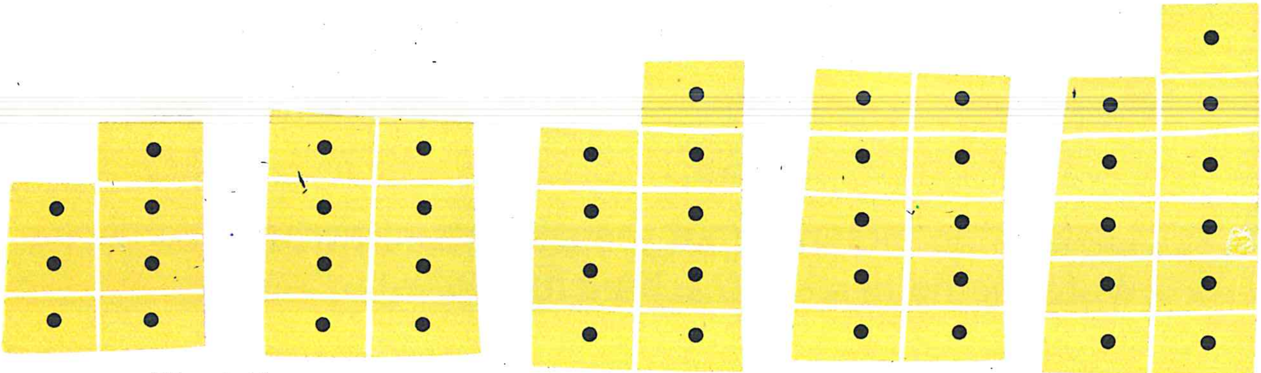
5	6	4	2	2	5	3
+4	+3	+4	+5	+8	+3	+4
9	9	8	7	10	8	7
3	4	4	5	5	6	6
+7	+6	+5	+2	+3	+4	+3
10	10	9	7	8	10	9

Guide children in using pictures at top of page to find missing addends in Ex. 3.
For step-by-step development of missing number concept see Guide page G 6.

Continue on page 8.

Explain the three types of subtraction examples (8 − 6 = ☐, 10 − ☐ = 6, ☐ − 8 = 2). Stress the use of the word subtract. As children work on Ex. 1 encourage them to use the pictures as needed, locating sets and subsets to help them find the answers.

PATTERNS HELP YOU SUBTRACT



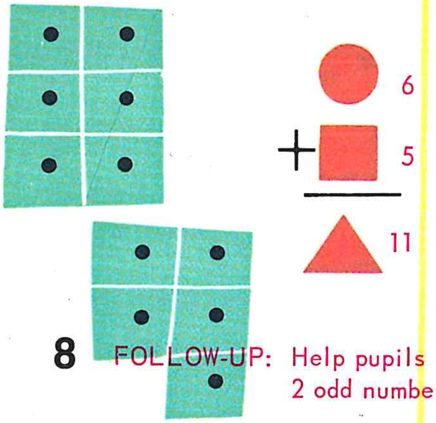
Find the answers.

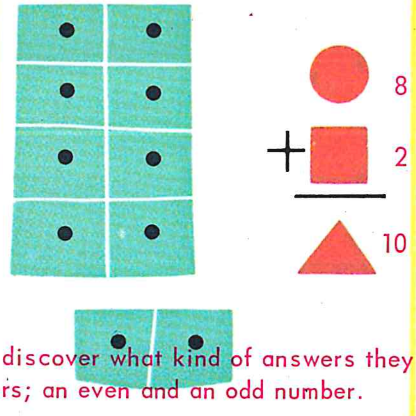
1.

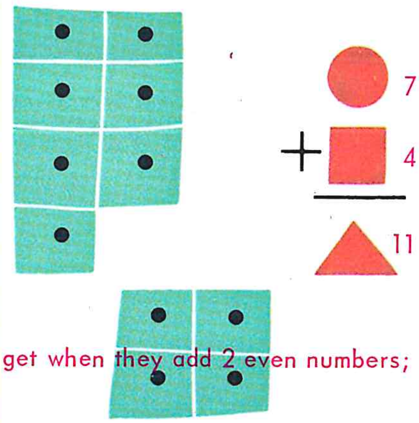
a.	8	10	11	10	9
	−6	− 4	− 8	−8	−3
	2	6	3	2	6
b.	11	7	11	10	9
	− 2	− 3	−4	− 7	− 7
	9	4	7	3	2
c.	10	10	7	8	11
	− 5	−7	−5	− 3	− 8
	5	3	2	5	3

As pupils combine squares to make patterns of ten or eleven, call attention to the two fives which make ten, and 10 and 1 more as 11.

2.







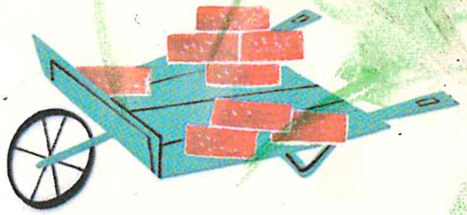
FOLLOW-UP: Help pupils discover what kind of answers they get when they add 2 even numbers; 2 odd numbers; an even and an odd number.

(G7) AIMS: Review adding three numbers; present column addition with sums through 11.
ACTIVITIES: G1, 2, 3, 4 (G120)
PROCEDURES: Demonstrate the use of the picture line in finding answers.

ADDING THREE NUMBERS

Have the pupils add the first two numbers, say the sum, then add the last number.

	3 bricks	4
5	1 brick	
	4 bricks	
	8 bricks	



Tell the story about building the flower box (G7). Have children tell stories about which boy carried the most bricks.

1. Add down. Write the answer. Then add up. Do you get the same answer?

a.	4 (5)	4	2	2	4
	(4) 1	2	5	3	3
	3	4	1	5	2
	8	10	8	10	9

Allow pupils to write the small digit at the side if necessary.

b.	4	1	3	1	3
	3	2	2	6	5
	4	8	3	2	3
	11	11	8	9	11

c.	2	3	6	2	2
	5	3	3	4	4
	3	3	2	2	3
	10	9	11	8	9

Encourage children to see whether answers in Ex. 2 are the same if algorithm is written vertically. Use picture line to check answers.

2. Find the answers.

$\overset{7}{3 + 4} + 3 = 10$

$1 + 7 + 2 = 10$

$\overset{5}{3 + 2} + 4 = 9$

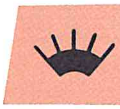
$2 + 4 + 5 = 11$

FOLLOW-UP: Repeat some of the Activities as needed.

(G8) AIMS: Use five as a base for understanding the numbers between five and twenty. Use five as a way of exploring the "teen" numbers.
ACTIVITIES: D3a, 4, 6 (G114)
PROCEDURES: Point out the symbol used to picture numbers. Have pupils work together to show numbers between 10 and 20 with their hands.

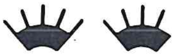
USING FIVE

for five and discuss how it can be


5 ones

4 ones

1. Write the numerals.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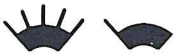
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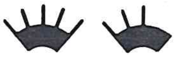
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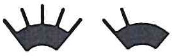
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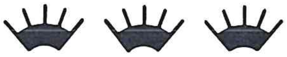
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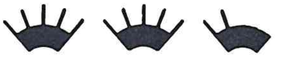
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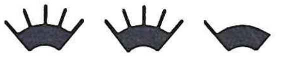
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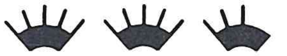
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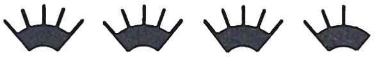
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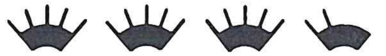

17

Call attention to the operations change from addition in 2a to subtraction in 2b.

2. Write the missing numerals.
Find hand pictures to help you.

Caution children that they will find the missing numeral in three different positions — at the beginning, in the middle, and at the end of the number sentence.

a. 5 + 6 = 11   5 + 3 = 8   5 + 1 = 6
4 + 5 = 9   5 + 5 = 10   2 + 5 = 7

b. 11 − 5 = 6   9 − 4 = 5   9 − 5 = 4
10 − 5 = 5   8 − 3 = 5   11 − 7 = 4

3. Write the missing numerals.

Be sure children are aware that one of three addends is missing from each number sentence.

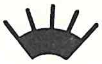
a. 5 + 2 + 3 = 10
3 + 2 + 2 = 7
2 + 3 + 2 = 7
3 + 2 + 6 = 11
4 + 5 + 1 = 10

b. 1 + 4 + 5 = 10
2 + 3 + 3 = 8
4 + 1 + 6 = 11
5 + 3 + 1 = 9
2 + 1 + 5 = 8

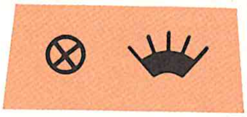
FOLLOW-UP: List numerals between 5 and 20 on the chalkboard. Have pupils draw hand pictures showing sets of five and necessary sets of less than five for each numeral.

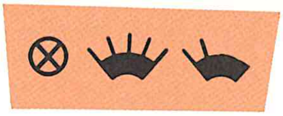
(G 8) AIMS: Work with numbers 10 – 20.
ACTIVITIES: D1, 2, 3a, b, c, 4, 5 (G114)
PROCEDURES: Teach the children the hand picture for 10, which they may think of as a picture of their hands clasped together. Have pupils write numerals for the hand pictures on this page.

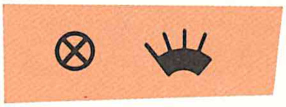
HAND PICTURES

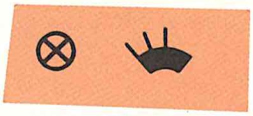

This picture stands for 5 ones.

This picture stands for ⊗
10 ones or 1 ten.


10 and 5


10 + 5 + 2


How many? 14


How many? 13

Discuss the pictures A–L helping the pupils decide what numbers they represent. Then let them try to draw hand pictures. These need not be perfect copies of those in the text. Any picture which indicates understanding should be accepted.

1. Look at the pictures.
How many tens? How many ones?
What is the number?

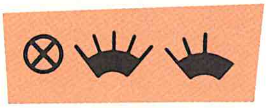
2. Draw pictures for each numeral below.
How many tens? How many ones?

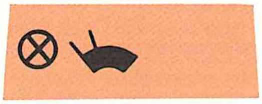
14
10
19
18
16

13
12
15
11
17

30
40
90
20
70

50
80
60
100

A


B


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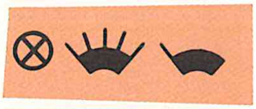

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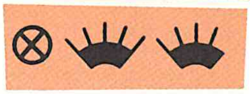

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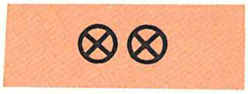

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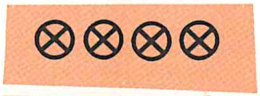

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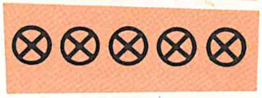

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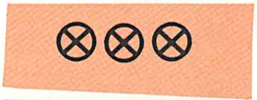

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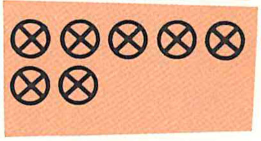

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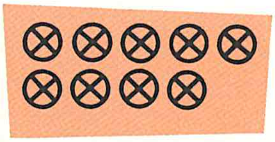

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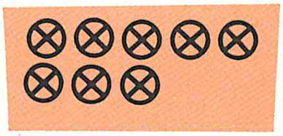
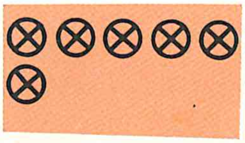
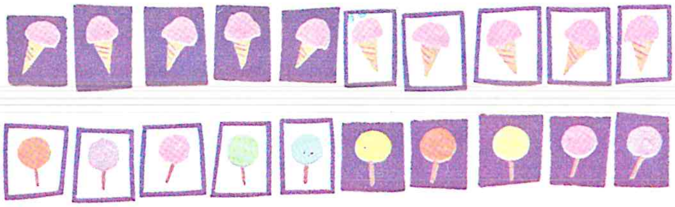


L


FOLLOW-UP: Repeat Activities from Section D.
Let pupils demonstrate some pictures with their clasped hands. "How many children are needed to show 20? 40? 50?"

(G9–10) AIMS: Teach names and number words for numbers 11 – 19; develop meaning for numbers 11 – 20.
ACTIVITIES: D6, A3 (G114) adapted for “teen” numbers.
PROCEDURES: Help pupils consider each numeral and its number name. Compare ten and “teen.” Each “teen” number means ten and some ones. Use suggested lists (G 9) to help pupils analyze the words and sounds.

TEN AND “TEEN”



1. How many tens?
How many ones?
Write the numerals.

Help the children understand the meaning of the arrows and how they apply to Ex. 1.

10 + 1 = 11
10 + 2 = 12
10 + 3 = 13
10 + 4 = 14
10 + 5 = 15
10 + 6 = 16
10 + 7 = 17
10 + 8 = 18
10 + 9 = 19
10 + 10 = 20

Have the class write the missing part or parts of the number sentence so that the word and the numeral will name the same number. Encourage them to think of these numerals as meaning one ten and so many more.

2. What do these words mean?

seventeen = 10 + 7
thirteen = 10 + 3
eighteen = 10 + 8
sixteen = 10 + 6

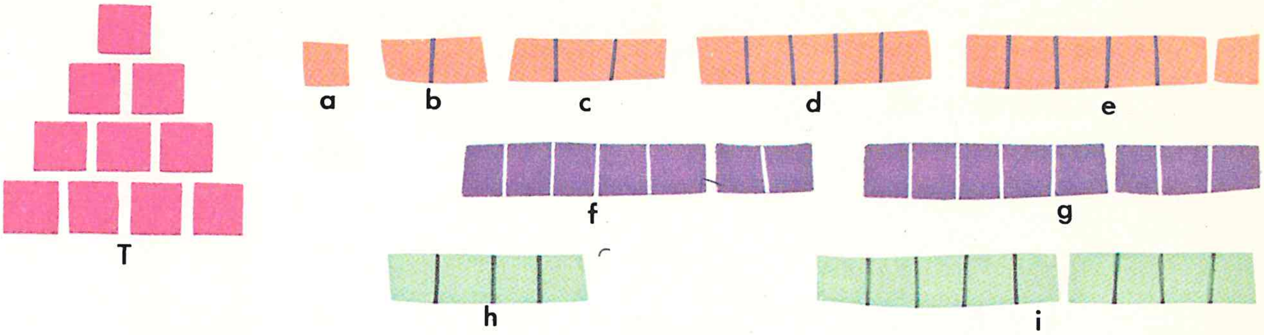
eleven = 10 + 1
twelve = 10 + 2
fourteen = 10 + 4
fifteen = 10 + 5

How many other ways can they make the number sentences true for eleven through fifteen? List on the chalkboard all the combinations they suggest.

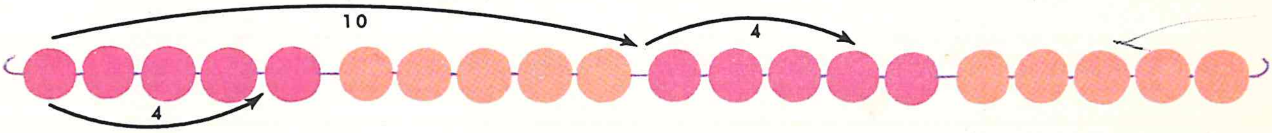
Continue on page 13.

In Ex. 1 call numbers and have pupils put together the ten picture (T) at the left with pictures a – i, so that the number of squares and the number called will match. Use Ex. 2 as an oral exercise to help children arrive at the generalization that the difference between each of the number pairs is ten. Have them show on the bead line how they found the answers.

WORKING WITH "TEEN" NUMBERS



1. Use the pictures to show "teen" numbers. When you show a number, use picture T and one other picture.



2. On the bead line show the difference between:

4 and 14
3 and 13
6 and 16
8 and 18

5 and 15
1 and 11
9 and 19
7 and 17

In Ex. 3 have pupils read number sentences, think of the missing numbers, and write the numerals. Although you will not be using the term, stress the commutative property that this exercise demonstrates.
6 + 10 = 10 + 6.

3. Write the missing numerals.

sixteen $= 6 + 10 = 10 + \boxed{6} = \boxed{16}$
seventeen $= 7 + 10 = 10 + \boxed{7} = \boxed{17}$
thirteen $= 3 + 10 = 10 + \boxed{3} = \boxed{13}$
nineteen $= 9 + 10 = 10 + \boxed{9} = \boxed{19}$
eighteen $= 8 + 10 = 10 + \boxed{8} = \boxed{18}$
eleven $= 1 + 10 = 10 + \boxed{1} = \boxed{11}$

FOLLOW-UP: Adapt any of the Activities in Section A (G105) for further work as needed.

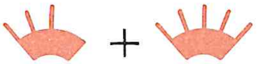
(G10–11) AIMS: Introduce higher decade addition and subtraction with answers in the same decade; practice addition and subtraction facts in a new learning setting.

ACTIVITIES: D1a–e, 2, 4, 5, 6; A4 adapted to "teen" numbers. (G114)

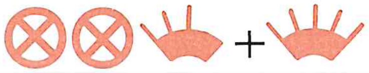
ADDING AND SUBTRACTING ONES

PROCEDURES: Have pupils tell what each picture shows. Help them think of 2–digit numbers as ten and so many ones. As they add and subtract, guide them to generalize with regard to adding and subtracting when the ones are a part of a higher decade number such as 24 + 3, or 25 – 4.

1.



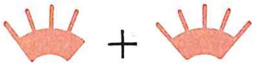
3 + 5 = 8



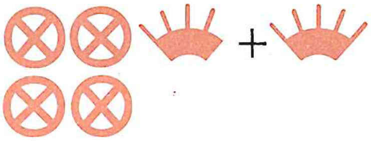
23 + 5 = 28

33 + 5 = 38

63 + 5 = 68



4 + 5 = 9

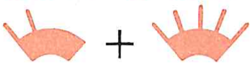


44 + 5 = 49

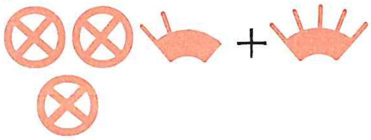
54 + 5 = 59

74 + 5 = 79

Help children to understand that we start with a basic fact and use it in building a higher decade fact, as 4 + 4 = 8, 30 + 4 + 4 = 38, 34 + 4 = 38.



2 + 5 = 7



32 + 5 = 37

52 + 5 = 57

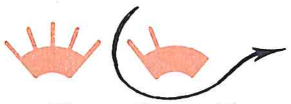
62 + 5 = 67

2. 55 + 3 = 58 71 + 6 = 77 22 + 7 = 29

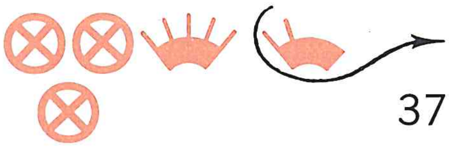
The children should be led to see that the ten's number does not change. The one's number changes because each time some ones are added or subtracted.

3.

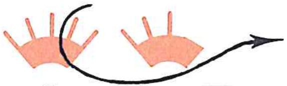
See if pupils can think what the arrows show.



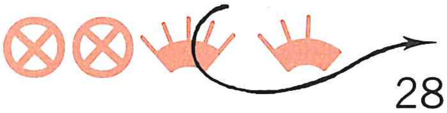
7 – 2 = 5



37 – 2 = 35

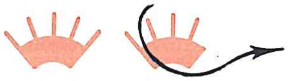


8 – 5 = 3

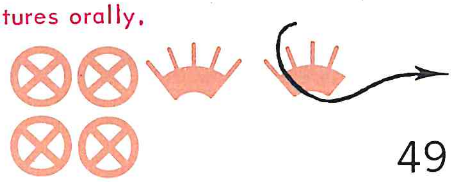


28 – 5 = 23

Have the children explain these hand pictures orally.



9 – 3 = 6



49 – 3 = 46

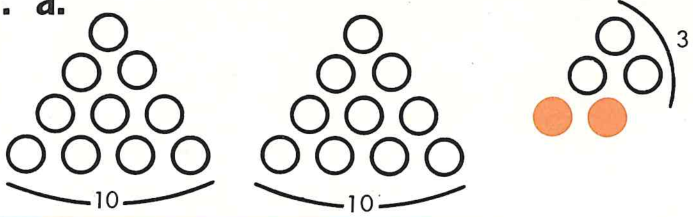
4. 57 – 2 = 55 38 – 3 = 35 63 – 3 = 60

Continue on page 15.

Discuss the dot pyramid. "How many dots in each row? altogether? How could we show 33?" Let the children discover the complete pyramid always has 10 dots. Work through Ex. 1 with the class, then let them write the answers.

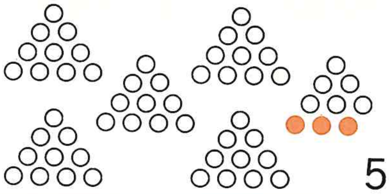
USING LARGER NUMBERS

1. a.



23 + 2 = 25
73 + 2 = 75
83 + 2 = 85

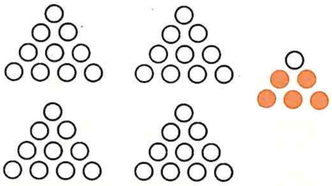
b.



56 + 3 = 59

26 + 3 = 29
66 + 3 = 69
96 + 3 = 99

c.



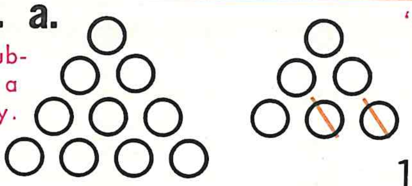
41 + 5 = 46

51 + 5 = 56
71 + 5 = 76
91 + 5 = 96

2. a.

Develop subtraction in a similar way.

"How can we show some dots are being taken away?"

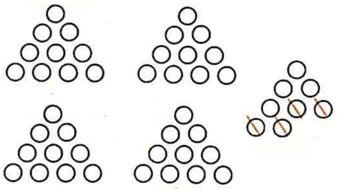


16 − 2 = 14

26 − 2 = 24
66 − 2 = 64
56 − 2 = 54

b.

Discuss each pictured number and what it means.



48 − 4 = 44

38 − 4 = 34
28 − 4 = 24
68 − 4 = 64

3. Find the missing numbers.

Answers for Ex. 3 may be written.

11 + 4 = 15
31 + 4 = 35
71 + 4 = 75

45 − 3 = 42
35 − 3 = 32
25 − 3 = 22

FOLLOW-UP: Repeat some of the Introductory Activities for this lesson.

(G 11) AIMS: Practice higher decade addition and subtraction. Review basic facts.
PROCEDURES: Encourage children who need them to use the pictures in the previous lesson.

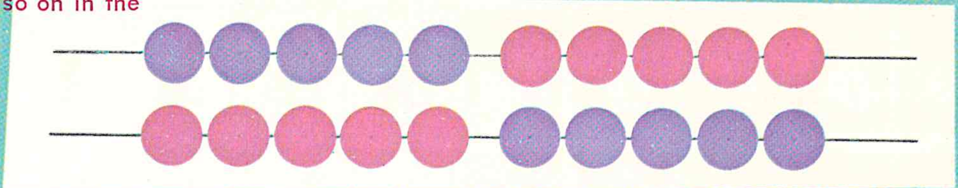
PRACTICE

	a	b
1.	$36 + \boxed{2} = 38$	$75 - 2 = \boxed{73}$
	$24 + \boxed{5} = 29$	$84 - 3 = \boxed{81}$
	$45 + \boxed{3} = 48$	$98 - 4 = \boxed{94}$
	$33 + \boxed{6} = 39$	$69 - 3 = \boxed{66}$
	$56 + \boxed{3} = 59$	$16 - 2 = \boxed{14}$
	$83 + \boxed{4} = 87$	$27 - 3 = \boxed{24}$
2.	$62 + 6 = \boxed{68}$	$84 - \boxed{2} = 82$
	$72 + 7 = \boxed{79}$	$67 - \boxed{5} = 62$
	$91 + 8 = \boxed{99}$	$89 - \boxed{4} = 85$
	$13 + 5 = \boxed{18}$	$78 - \boxed{6} = 72$
	$72 + 5 = \boxed{77}$	$36 - \boxed{3} = 33$
	$51 + 6 = \boxed{57}$	$48 - \boxed{5} = 43$
3.	$9 + 2 = \boxed{11}$	$8 - 4 = \boxed{4}$
	$2 + \boxed{6} = 8$	$11 - \boxed{7} = 4$
	$7 + \boxed{4} = 11$	$\boxed{11} - 4 = 7$
	$5 + 4 = \boxed{9}$	$9 - 3 = \boxed{6}$
	$3 + 6 = \boxed{9}$	$\boxed{11} - 9 = 2$
	$\boxed{5} + 3 = 8$	$\boxed{9} - 2 = 7$

FOLLOW-UP: Plan work for small groups who need additional help. Use 10 × 10 chart or bead frame.

(G11–12) AIMS: Practice to achieve mastery of addition facts with sums less than 10; continue exploration of addition facts with sums of 11.
ACTIVITIES: E1–10 (G117)
PROCEDURES: Review ordinals first through tenth. Have pupils point to and tell which beads are first, second, and so on in the bead line.

FIND THE ANSWER



1. Look at the bead lines. Find 11.
Find these numbers: 18, 14, 16, 19, 13.
Show the 4th bead; the 5th; the 3rd in the 2nd line.

In Ex. 2, demonstrate the use of one row for finding answers to the facts for ten and for all numbers below ten; point out the need to include the first object on the second row when they need eleven objects.

2. How many?

a. 7 + 3 = 10	**b.** 4 + 5 = 9	**c.** 6 + 2 = 8
5 + 6 = 11	2 + 9 = 11	3 + 6 = 9
7 + 2 = 9	8 + 2 = 10	6 + 5 = 11
3 + 5 = 8	1 + 8 = 9	3 + 8 = 11
2 + 8 = 10	7 + 4 = 11	5 + 4 = 9
6 + 3 = 9	4 + 6 = 10	8 + 3 = 11
4 + 7 = 11	5 + 3 = 8	6 + 5 = 11

Ex. 3. Guide children to use bead line to find several combinations for 8.

3. Make this number sentence true. ● + ■ = 8

6 + 2 = 8, or 1 + 7 = 8, or 3 + 5 = 8

Think of other number sentences for 8.

Ex. 4. Answers will vary. Accept any correct combinations. Able pupils may find more than three.

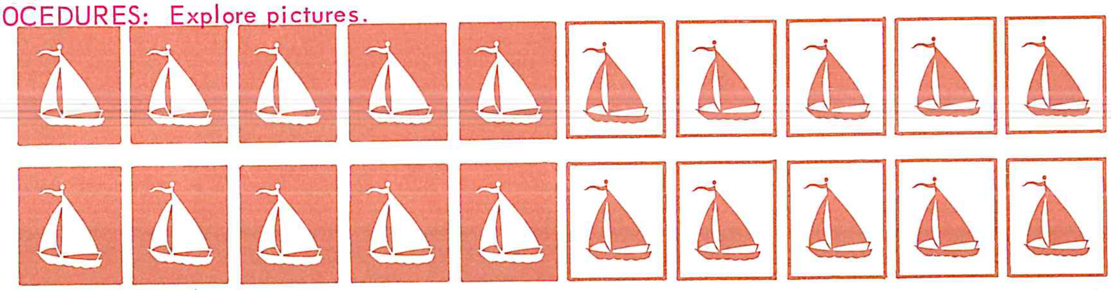
4. Find three ways to make each of these sentences true.

▲ + ■ = 11	▲ + 3 = ■	▲ + 7 = ■
▲ + ■ = 10	▲ + 6 = ■	▲ + 4 = ■
▲ + ■ = 9	▲ + 9 = ■	▲ + 8 = ■

FOLLOW-UP: Use any of the Activities suggested above.

(G12–13) AIMS: Practice to achieve mastery of addition, and complete missing number facts with sums through 10; more exploration of facts with sums through 11.
ACTIVITIES: E8, 9, 10a–b, 5, 6, (G118)
PROCEDURES: Explore pictures.

HOW MANY?



To find what is left, they will find the total, cover the number to be subtracted, and determine the remainder. Give help on facts for 11.

1. How many more is:

10 than 2? 8
9 than 6? 3
11 than 5? 6
8 than 3? 5
10 than 7? 3
9 than 2? 7
11 than 8? 3

2. How many less is:

2 than 8? 6
4 than 10? 6
6 than 11? 5
3 than 9? 6
6 than 10? 4
4 than 11? 7
5 than 8? 3

3. What is left?

11 − 7 = 4
9 − 5 = 4
10 − 8 = 2
11 − 2 = 9
8 − 6 = 2
11 − 6 = 5
8 − 5 = 3

Use some chalkboard examples to start pupils thinking how many different numbers they can subtract from 9; how many pairs of numbers have a difference of 4; and so on.

Answers will vary.

4. Make the number sentences true.
Can you write them in other ways? YES

9 − △ = □
11 − △ = □
10 − △ = □
8 − △ = □

⬡ − △ = 4
⬡ − △ = 5
⬡ − △ = 2
⬡ − △ = 3

□ − 3 = △
□ − 1 = △
□ − 6 = △
□ − 10 = △

FOLLOW-UP: Pupils who finish the written work quickly might make a list of all the combinations they can find for the first 4 examples in Ex. 4.

(G13) AIMS: Test mastery of addition and subtraction facts with sums and minuends through 10.

PROCEDURES: Set up the test situation most helpful in your class – either small groups or the entire class. You may wish to have pupils complete each section separately.

DO YOU KNOW?

1.	7	4	9	6	5	8
	+2	+2	+1	+1	+2	+1
	9	6	10	7	7	9

Children may write only the answers or copy the examples and write answers. You may wish to have examples copied a day or two in advance. If so, help the class check papers for accuracy before they begin to write answers.

2.	6	7	8	3	5	1
	+2	+1	+2	+2	+1	+2
	8	8	10	5	6	3

3.	1	2	2	1	2	2
	+9	+6	+4	+7	+5	+7
	10	8	6	8	7	9

4.	8	7	9	10	8	10
	−2	−1	−1	− 2	−1	− 1
	6	6	8	8	7	9

5.	9	7	6	5	3	4
	−2	−2	−1	−2	−2	−2
	7	5	5	3	1	2

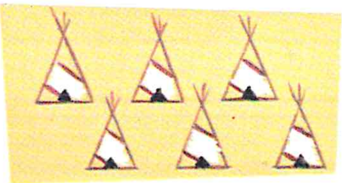
6.	9	10	8	7	10	8
	−7	− 9	−7	−5	− 8	−6
	2	1	1	2	2	2

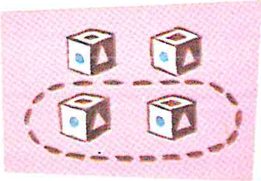
FOLLOW-UP: Give additional practice to those individuals who need it.

(G13) AIMS: Understand mathematical vocabulary and use of terms.
PROCEDURES: Use this page as oral work, allowing pupils to tell in their own words what each term means. The children should be encouraged to use these mathematical terms in their explanations and questions.

TO HELP YOU REMEMBER

1. Sets

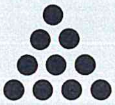


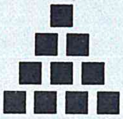


Subset

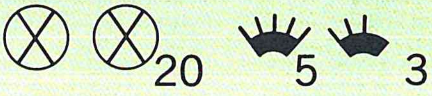
Numerals 1 2 3 4 5 6 7 8 9 10

2. Pictures of 10





3. Tens and ones

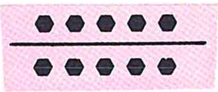


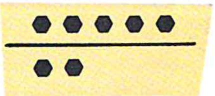
Have children dramatize some hand pictures.

4. Add +
Adding 3 + 2 = 5
Answer 5

5. Subtract −
Subtracting 5 − 2 = 3
Answer 3

Let pupils make up some examples that show adding or subtracting.





Extend with chalkboard examples as needed.

6. How many **more** is 10 than 7?
How many **less** is 7 than 10?
What is the **difference** between the two numbers?

7. Number sentences 3 + 5 = 8 4 − 1 = 3
They are **true** number sentences.

8.

10	ten	15	fifteen
11	eleven	16	sixteen
12	twelve	17	seventeen
13	thirteen	18	eighteen
14	fourteen	19	nineteen

Pupils may find picture lines in the text to help them build "teen" numbers.

FOLLOW-UP: Plan individual help for children who are uncertain of the meanings.

(G14) AIMS: Find one more and two more than a given number; find one less and two less than a given number.

PROCEDURES: Use this lesson for children who can work by themselves, or develop it with the entire class. Call attention to the meaning of more and less. You will probably want to discuss orally the first two or three examples in each column.

ENRICHMENT

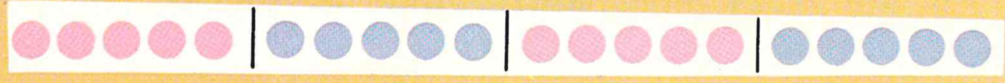
1. Write numerals that are one less and one more.

	One Less		One More	One Less		One More	One Less		One More
a.	7	8	9	11	12	13	13	14	15
b.	16	17	18	5	6	7	8	9	10
c.	12	13	14	6	7	8	9	10	11
d.	15	16	17	10	11	12	14	15	16
e.	18	19	20	26	27	28	29	30	31
f.	40	41	42	47	48	49	38	39	40
g.	24	25	26	20	21	22	37	38	39
h.	43	44	45	22	23	24	35	36	37

Encourage children to work with the dot line at the bottom as needed

2. Write numerals that are two less and two more.

a.	4	6	8	12	14	16	7	9	11
b.	14	16	18	10	12	14	13	15	17
c.	16	18	20	11	13	15	9	11	13
d.	17	19	21	5	7	9	15	17	19
e.	8	10	12	6	8	10	3	5	7
f.	26	28	30	35	37	39	20	22	24
g.	31	33	35	40	42	44	24	26	28

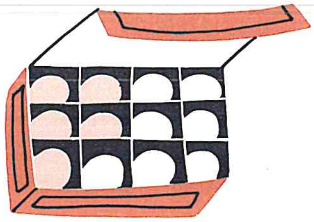


FOLLOW-UP: Use some chalkboard exercises as described in lesson suggestions. (G14)

(G 16) AIMS: Explore sets of 9 – 12 objects; discover addition facts with sums of 9 – 12 and related subtraction facts. ACTIVITIES: A3 (adapted for sets of 12 objects), A9 (G106). PROCEDURES: Provide some information on poultry farms which will be of interest to pupils as it relates to lessons in this chapter. (See G 16).

SETS OF 9 THROUGH 12

1.

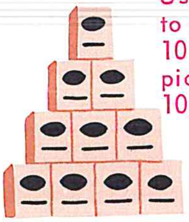


Have pupils discuss how the eggs are arranged (3 rows of 4 or 4 rows of 3).

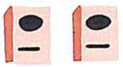
How many eggs?
How many brown eggs?
Count the eggs by 3's;
by 4's.

Use markers to explore facts for 12.

2.



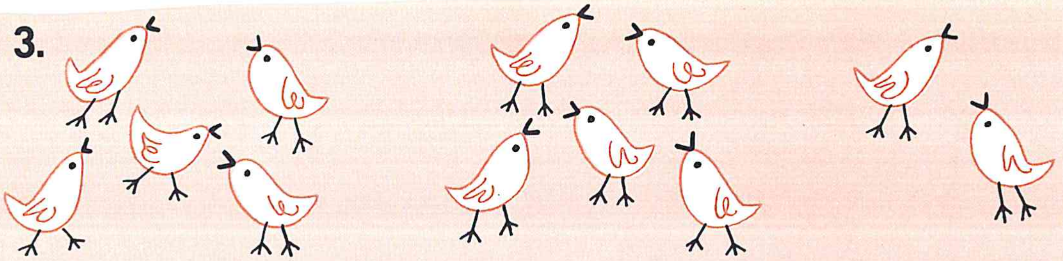
Use the boxes of poultry food to discover that 12 is equal to 10 and 2, 3 and 9, 4 and 8. Use pictures to review facts for 9, 10, and 11. Notice the pyramid form



which pupils can recognize as a set of 10.

How many boxes of feed?
Are there as many boxes of feed as eggs?

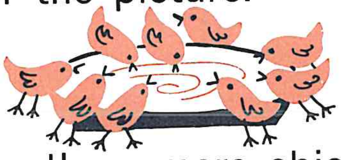
3.



How many baby chicks? How do you know?
Cover some chicks. How many do you see?
Is there a box of feed in picture **2** for each chick?
Are there as many chicks as eggs?

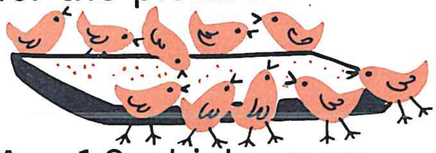
Have the children observe the patterns made by the chicks eating and determine how many are in the picture.

4. Write a number story for the picture.



Are there more chicks in picture **3** than here?

5. Write a number story for the picture.



Are 10 chicks more than 9 chicks?

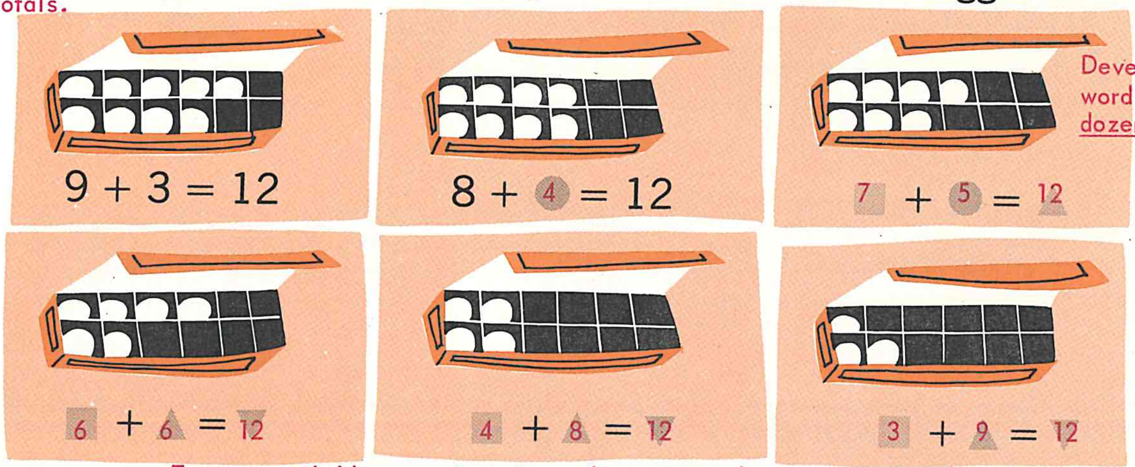
FOLLOW-UP: Encourage pupils to make up number sentences about the pictures on this page. Record the combinations on the chalkboard, omitting the answers, and use these for review. Use Activity B5 (G 109).

(G16–17) AIMS: Develop the missing number idea; provide practice in adding the number of objects in sets and in comparing the sets. ACTIVITIES: A10, 11 (G106)

PROCEDURES: Guide pupils to find how many eggs are in each box and how many it would take to fill each box. Encourage them to recognize the largest set they can, and to combine sets to find totals.

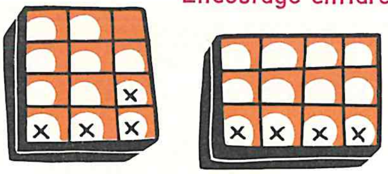
NUMBER STORIES

1. How many are missing? A box can hold 12 eggs.



Develop word dozen.

Encourage children to originate number stories about eggs, using the eggs with X as unturned eggs in an incubator.



2. Tell a number story.
How many eggs in each picture?
How many have an X on them?

Let pupils tell you how to write the number sentences.

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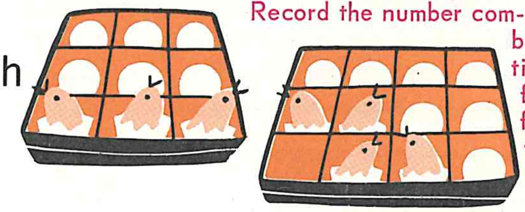
3. How many chicks are out?
Tell a number story for each picture. Write the number sentences.



Have pupils tell stories about each picture. Record the number combinations for future use.

Ex. 4 may be used as either written or oral work, depending on individuals and their progress.

4. Write the missing numerals.

a.

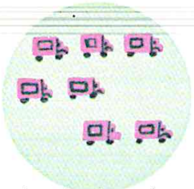
9	7	6	8	4	6	8
+ 3	+ 5	+ 5	+ 4	+ 6	+ 3	+ 3
12	12	11	12	10	9	11

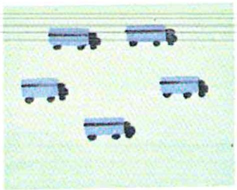
b.
11 − 3 = 8 10 − 4 = 6 12 − 4 = 8
9 − 4 = 5 12 − 8 = 4 11 − 5 = 6

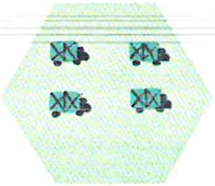
FOLLOW-UP: If Ex. 4 was used as written work, use again as an oral exercise.

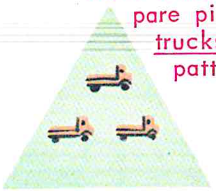
(G17–18) AIMS: Use pictured data in solving problems; practice on facts.
ACTIVITIES: A9, 10; C1, 2 (G106)
PROCEDURES: Have the class use the data from pictures for making up and solving problems using addition, subtraction, multiplication, and division. Have children compare pictures of trucks and dot patterns.

HOW MANY MORE OR LESS?

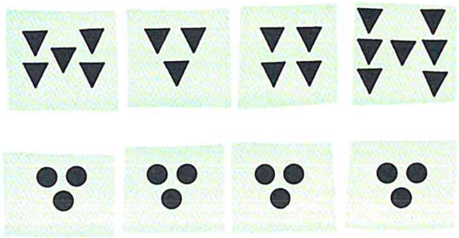

Joe's trucks


Billy's trucks


Jimmy's trucks

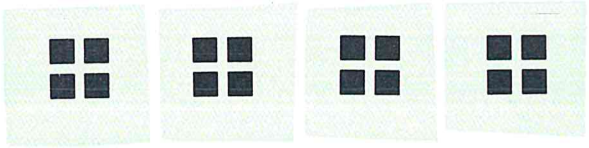

Tom's trucks

1. Each boy has how many trucks? Find a picture at the right which shows each number.



Have them complete Ex. 4–6, using picture line as they need to.

2. Tom is buying 3 more trucks. How many are 2 threes? 3 threes? 4 threes?



3. Are 3 fours as many as 4 threes? Yes

4. How many?

Help pupils show on the picture line how they found answers.

2 fives = 10
3 fours = 12
4 threes = 12
3 threes = 9
2 sixes = 12

5. What number is:

2 more than 5 7
2 more than 7 9
2 less than 7 5
1 less than 9 8
2 less than 10 8

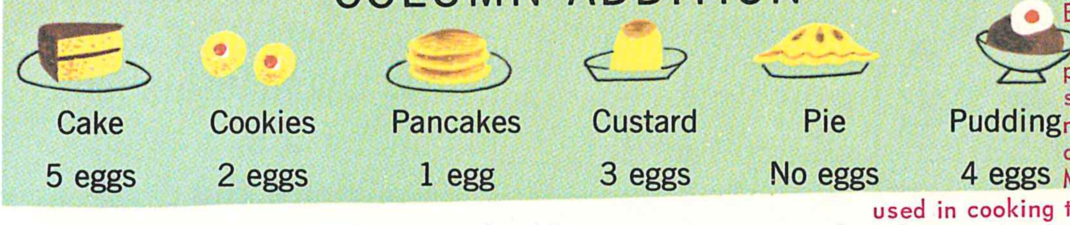
6. Find the answers.

8	3	5	11	10	12	11
+4	+7	+4	− 7	− 3	− 5	− 9
12	10	9	4	7	7	2

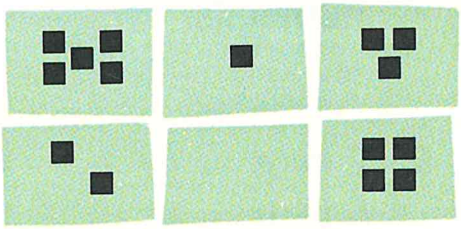
FOLLOW-UP: Have pupils draw dot pictures to illustrate number problems.

(G18) AIMS: Use pictured data to solve problems; use zero in addition; practice adding three numbers.
ACTIVITIES: C1, 2, 3; G1, 2, 4 (G113)
PROCEDURES: Help children with names under pictures.

COLUMN ADDITION



Explain that the pictures show the number of eggs Mother used in cooking the pictured items.



1. How many eggs in the cake? in the cookies? in the pie? Find sets of squares to match the pictures above.

Explain that the set of eggs needed to make a pie is the empty set since no eggs were used.

2. Tell a number story for each example. Find the answers.

Remind the pupils to look at the arrows in the first example. By adding both down and up they can check their work.

5	4	5	5	2	1	3	4
1	2	0	3	4	5	5	3
4	3	4	4	3	4	2	0
10	9	9	12	9	10	10	7

Have one or two examples put on the chalkboard showing sub-totals.

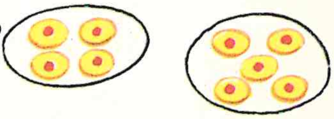
3. 3 + 1 + 4 = 8 2 + 3 + 4 = 9
2 + 5 + 1 = 8 5 + 0 + 3 = 8

Individuals who do not need aids should be encouraged to work without them.

4. There were 12 eggs in the box.
Mother used 7 eggs. How many were left? 5

5. Five children ate 3 pancakes each. How many did they eat altogether? 15

6. How many cookies are on the two plates? 9

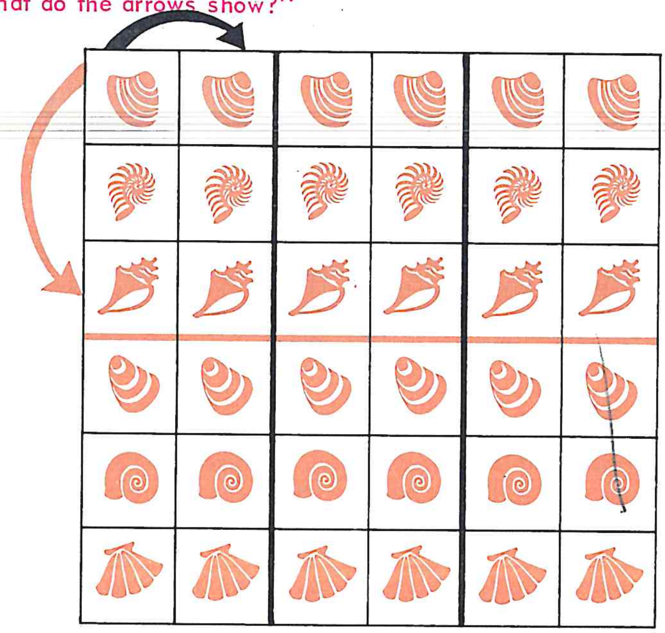


FOLLOW-UP: Provide simple exercises in buying and selling eggs to review coins.
See Teaching Suggestion on G18.

(G18–19) AIMS: Review counting by twos and threes to 36; discover multiplication facts with products through 12 and related division facts. ACTIVITIES: A9, 10a–c (G106)

TWOS AND THREES

PROCEDURES: Discuss the pattern of the picture. How many rows? "What do the heavy black lines mark? (2 rows) What does the brown line mark? (3 rows) What do the arrows show?" (2 threes = 3 twos) (Commutative property).



1. Count the shells by 2's. Write the numerals.

Discuss the pattern of answers for twos and threes.

2. 2 twos = 4
6 twos = 12
5 twos = 10
3 twos = 6
4 twos = 8

3. Count the shells by 3's. Write the numerals.

The children may write answers for Ex. 4 and 5 using the pictures if they need help.

4. 2 threes = 6   4 threes = 12   3 threes = 9

5. Find the missing numerals.
a. 3 twos = 6   2 twos = 4   3 threes = 9
b. 6 twos = 12   5 twos = 10   1 threes = 3
c. 4 twos = 8   2 threes = 6   4 threes = 12

Use Ex. 6 as an oral exercise to stimulate thinking.

6. Which of the numerals in the box are used to count by 2's? by 3's?

Which are used to count by both 2's and 3's?

2 12
8 10
4 9 6

FOLLOW-UP: Repeat any of the Activities suggested for this lesson as needed.

(G19–20) AIMS: Use the calendar in keeping records and solving problems; use a line arrangement as an aid in solving problems; extend use of ordinals.

ACTIVITIES: Let pupils explore classroom or large calendar.

PROCEDURES: Discuss month, days of the week, number of days in this the number of days in each full week, the number of days in the last and first weeks.

USING THE CALENDAR

calendar on the page; the the day of Oct. 1, the month, the day of Oct. 31,

First	1
Second	2
Third	3
Fourth	4
Fifth	5

OCTOBER

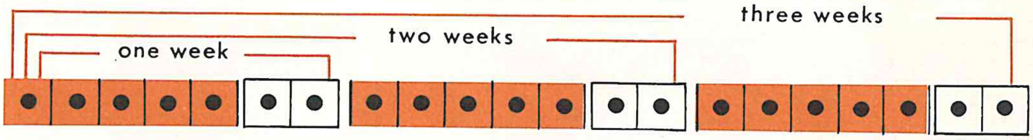
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

Help children read days of week. Note but do not stress abbreviations on calendar.

1. Can you name the days of the week?
2. Find the dates of all the Tuesdays; the Fridays.
3. Monday of the fifth week is 28.
4. What date is Saturday of week 3? 19
5. Sunday of the fourth week is 20.

As you read the story aloud (G19–20), help the pupils use the calendar or picture line to find answers.



Have pupils find or write number sentences to go with problems (G19–20).

6. How many days?
   6 + 6 = 12
   12 − 4 = 8
   4 + 3 = 7
   12 − 7 = 5
   4 + 3 + 2 = 9

7. How many are:
   4 twos? 8
   5 twos? 10
   6 twos? 12
   3 twos? 6

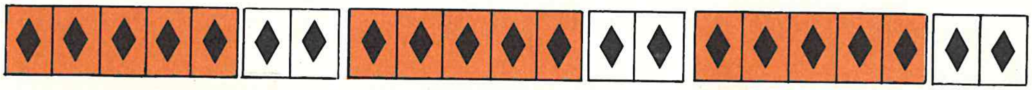
8. Find the day before:
   October 10 9; 11
   October 21 20; 22
   October 8 7; 9
   October 17 16; 18
   October 11 10; 12

Find the day after each.

9. Find the answers.

Ex. 6–9 may be used as either written or oral work.

7 + 5 = 12
4 + 7 = 11
4 + 8 = 12
8 + 3 = 11
5 + 6 = 11
7 + 4 = 11

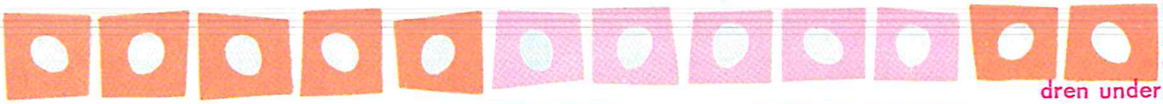


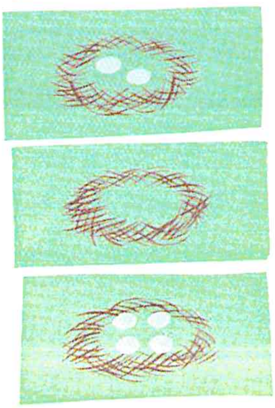
FOLLOW-UP: Use the classroom calendar for additional practice, choosing dates and locating days before, days after, a week later, and so on.

(G21) AIMS: Extend understanding of vertical and horizontal addition of three numbers.
ACTIVITIES: G1–6 (G120)
PROCEDURES: Encourage rapid recognition of numbers of objects in sets. Review procedure of adding the first two numbers, beginning at the top, adding the sum to the last number, and putting the answer under the example. Discuss pictures and numerals in each example. Be sure children understand adding zero.

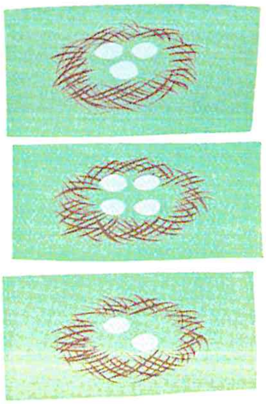
THREE NUMBERS TO ADD

1. Add down; then add up.

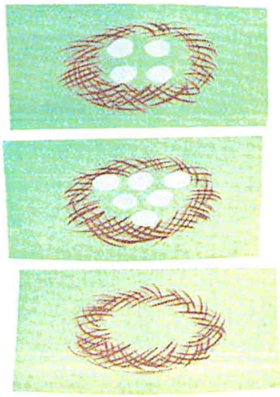




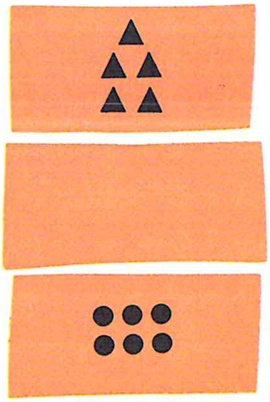
2
0
4
6



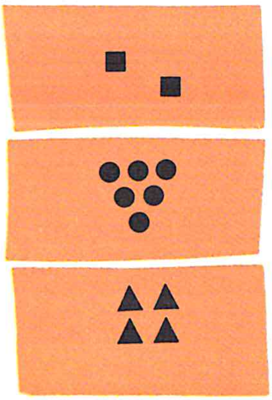
3
4
2
9



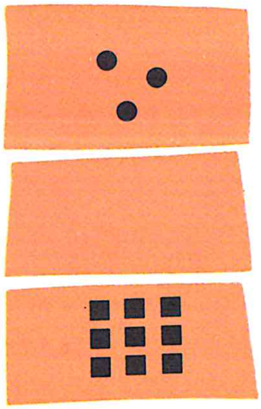
4
6
0
10



5
0
6
11



2
6
4
12



3
0
9
12

Ex. 2a. Use chalkboard examples to show 2 + 0 = 2
2 + 6 = 8.

2. Find the answers.

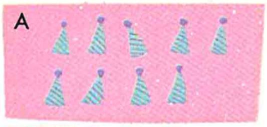
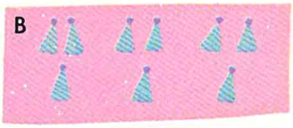
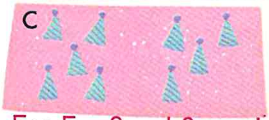
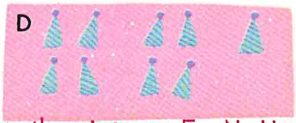
Help children use the picture line, if necessary, in Ex. 2. Set up same examples vertically. "Are answers the same?"

a. 2 + 0 + 6 = 8   3 + 0 + 8 = 11   3 + 5 + 3 = 11
b. 4 + 7 + 0 = 11   6 + 3 + 0 = 9   5 + 0 + 7 = 12
c. 4 + 4 + 2 = 10   5 + 2 + 3 = 10   3 + 2 + 4 = 9
d. 5 + 5 + 0 = 10   5 + 6 + 1 = 12   2 + 5 + 1 = 8

FOLLOW-UP: Able children might rearrange numerals and try adding them. 6 + 2 + 0 = □, 7 + 0 + 4 = □, and so on. Activities G6, 7, 8 (G120).

G21) AIMS: Use sets to discover addition facts with sums of 9 – 12 and related subtraction facts; ultiplication facts with products of 9 – 12 and related division facts.
CTIVITIES: B9, 10, 11 (G110)
ROCEDURES: Help pupils compare pictures A – D.
'How are they alike? different?'' Encourage answers to questions in terms of twos, threes, fours, and so on.

SETS AND SUBSETS

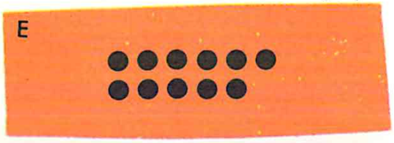
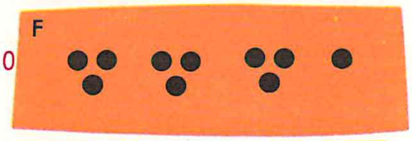
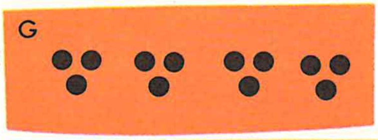
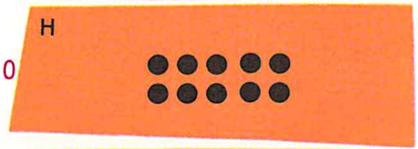
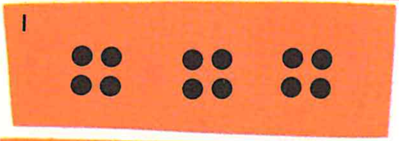
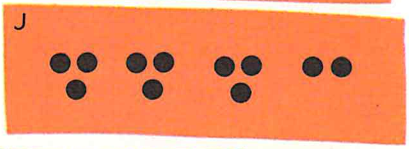
A

B

C

D


1. How many s in A? in B? in C? in D? 9
How are the pictures different? different subsets

For Ex. 2 and 3, explore the pictures E – N. Have pupils share ways in which they determined the number of objects in each picture.

2. How many ●s in picture E? 11 in F? 10 in G? 12 H? 10 I? 12 J? 11
Which pictures have the same number?

3. How many s in picture K? 11 in L? 10 M? 10 N? 12

E
11

F
10

G
12

H
0

I
2

J
1


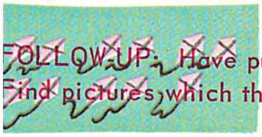
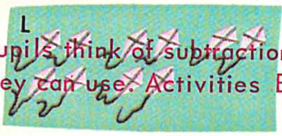
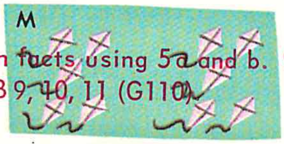
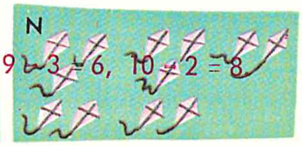
4. Find the missing numerals.

10 = 5 twos
10 = 2 fives
9 = 3 threes
12 = 6 twos
12 = 4 threes
12 = 3 fours

Let pupils find pictures to demonstrate their answers.

5. Find the answers.

a.	6 +3 9	8 +2 10	5 +6 11	4 +8 12	7 +5 12	4 +7 11
b.	3 +7 10	6 +4 10	3 +9 12	7 +3 10	3 +8 11	2 +7 9

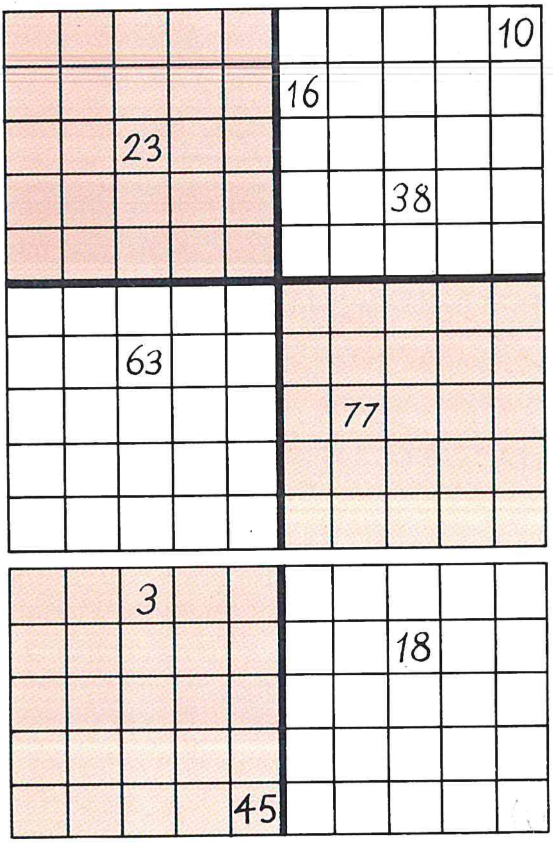

L

M

N


FOLLOW-UP: Have pupils think of subtraction facts using 5a and b. 9 – 3 = 6, 10 – 2 = 8.
Find pictures which they can use. Activities B 9, 10, 11 (G110)

(G22) AIMS: Develop understanding of the numbers 100 – 120; that tens are added and subtracted just as ones are.
ACTIVITIES: D7–9 (G115)

PROCEDURES: Have children locate various squares on the 10 × 10 block. They may use the markers to demonstrate their understanding of adding and subtracting tens. "How many squares in 10 rows?" 100 "How many in the lower block?" 50

100 THROUGH 120



1. How many squares in one line? 10 five lines? 50 two lines? 20

2. 3 tens = 30
+2 tens = 20
5 tens = 50

2 tens 20
+4 tens 40
6 tens 60

5 tens 50
+6 tens 60
11 tens 110

3. Show 20 on the chart; 120. Show 48. 48 is 4 tens, and 8 ones. Show 103.

Explain that they may use the five rows of tens below the 100 square to help them show answers in Ex. 3 and 4. Put on chalkboard, or dictate, other combinations for children to show in the pictures and to write. Let pupils think of numerals between 1 and 120 for others to locate or write.

4. one hundred three =

1 hundred + 0 tens + 3 ones = 103

one hundred thirteen =

1 hundred + 1 ten + 3 ones = 113

one hundred twenty =

1 hundred + 2 tens + 0 ones = 120

Stress correct reading: "one hundred three," not "one hundred and three."

FOLLOW-UP: D7–9 (G115)

(G22) AIMS: Develop understanding of the numbers 100 – 150.
ACTIVITIES: D7–9 (G115)
PROCEDURES: Have children give answers orally for Ex. 2. Allow pupils to use their markers to find the answers for Ex. 3. Ex. 4 and 5 will test children's ability to interpret the number words and numerals.

100 THROUGH 150

1. 5 tens = 50
−3 tens = 30
2 tens = 20

2. 4 tens − 3 tens = 1 tens
8 tens − 4 tens = 4 tens
9 tens − 5 tens = 4 tens

After completing Ex. 3 – 4, call on individual pupils to write similar numerals on the chalkboard as directed.

3. Use the pictures on page 30 to help you.

2 tens = 20 | 4 tens = 40 | 5 tens = 50
9 tens = 90 | 10 tens = 100 | 12 tens = 120
14 tens = 140 | 7 tens = 70 | 15 tens = 150
8 tens = 80 | 11 tens = 110 | 3 tens = 30

---

4. Write the numerals.

one hundred thirty 130
one hundred twelve 112
one hundred fifty 150
one hundred seventeen 117

forty 40
eighty 80
ninety 90
seventy 70

---

5. Match the number words and numerals.

Using a 100 board, have a child point to a square and call on other children for answers.

a. one hundred three — 109 c
b. one hundred five — 118 d
c. one hundred nine — 105 b
d. one hundred eighteen — 103 a

---

6. Find the answers. May be a written exercise.

50	70	90	20	60	40	80	90
−20	−40	−30	−10	−50	−30	−40	−80
30	30	60	10	10	10	40	10

FOLLOW-UP: Vary the exercises on pages 30 and 31, giving more practice to pupils who need it. See Section G (G120).

(G22) AIMS: Practice with number facts, missing-number concept, and subtracting tens.
PROCEDURES: You may use the page as a written assignment for the whole class or as independent work for one group while you help individuals.

PRACTICE

1. 10 = $\boxed{2}$ fives
10 = $\boxed{5}$ twos
9 = $\boxed{3}$ threes
8 = $\boxed{2}$ fours
8 = $\boxed{4}$ twos

2. 2 fours = $\boxed{8}$
3 threes = $\boxed{9}$
5 twos = $\boxed{10}$
4 twos = $\boxed{8}$
2 fives = $\boxed{10}$

3. 3 threes + 1 = $\boxed{10}$
2 fours + 1 = $\boxed{9}$
1 five + 4 = $\boxed{9}$
5 twos + 1 = $\boxed{11}$
1 four + 3 = $\boxed{7}$

4. 4 twos + 1 = $\boxed{9}$
2 fours + 2 = $\boxed{10}$
2 fours + 3 = $\boxed{11}$
3 threes + 2 = $\boxed{11}$
1 five + 3 = $\boxed{8}$

5. 4 + 4 = $\boxed{8}$　　5 + $\boxed{5}$ = 10　　5 + 5 + 1 = $\boxed{11}$
6 + 3 = $\boxed{9}$　　9 + $\boxed{1}$ = 10　　4 + $\boxed{4}$ + 3 = 11

6. a. 10 = 3 + $\boxed{7}$　　7 + 2 + $\boxed{2}$ = 11　　11 = 10 + $\boxed{1}$
b. $\boxed{9}$ = 5 + 4　　4 + 1 + $\boxed{6}$ = 11　　$\boxed{8}$ = 6 + 2
c. $\boxed{10}$ = 6 + 4　　5 + 3 + $\boxed{1}$ = 9　　8 = 3 + $\boxed{5}$

7.

$$\begin{array}{r} 4 \\ +8 \\ \hline \boxed{12} \end{array} \qquad \begin{array}{r} 7 \\ +3 \\ \hline \boxed{10} \end{array} \qquad \begin{array}{r} 5 \\ +\boxed{4} \\ \hline 9 \end{array} \qquad \begin{array}{r} 70 \\ -20 \\ \hline \boxed{50} \end{array} \qquad \begin{array}{r} 90 \\ -30 \\ \hline \boxed{60} \end{array}$$

FOLLOW-UP: Provide additional practice as needed for individuals or small groups.

(G23) AIMS: Analyze numerals in terms of hundreds, tens, and ones; think of various numerals which stand for the same number. ACTIVITIES: D7–9 (G115)

PROCEDURES: Following oral practice of the page, the group should copy some or all of the expanded numerals in Ex. 1 – 3 matching each with the corresponding numeral at the right.

HUNDREDS, TENS, ONES

1. Write another numeral for:

a. $100 + 20 + 6$ $100 + 10 + 4$
b. $100 + 30 + 9$ $100 + 40 + 2$
c. $100 + 40 + 1$ $100 + 30 + 0$
d. $100 + 20 + 7$ $100 + 20 + 8$
e. $100 + 30 + 3$ $100 + 10 + 6$

Develop simplest form for each: 126, 139, etc. Discuss other forms as well. 120 + 6, 130 + 9, etc.

2. Which numeral at the right shows:

a. $120 + 0$ $140 + 5$ $110 + 2$
b. $110 + 6$ $130 + 7$ $130 + 3$
c. $100 + 3$ $140 + 1$ $120 + 6$
d. $120 + 8$ $120 + 7$ $100 + 1$
e. $130 + 9$ $110 + 4$ $140 + 2$

Have pupils close their books. Put some of the numerals on the chalkboard. Have different individuals tell how many tens and how many ones in each.

3. Which numeral at the right shows:

a. $100 + 16$ $100 + 14$ $100 + 3$
b. $100 + 20$ $100 + 1$ $100 + 33$
c. $100 + 0$ $100 + 30$ $100 + 41$
d. $100 + 27$ $100 + 12$ $100 + 39$
e. $100 + 6$ $100 + 26$ $100 + 42$

Hundreds	Tens	Ones
1	2	8
1	1	6
1	0	3
1	3	7
1	4	5
1	2	0
1	3	3
1	2	6
1	1	4
1	0	1
1	4	2
1	1	2
1	0	0
1	3	9
1	0	6
1	4	1
1	2	7
1	3	0

FOLLOW-UP: Activities D14–17 (G116)

(G23–24) AIMS: Help the pupils determine how many more are needed.
ACTIVITIES: B5; C3 (G109)
PROCEDURES: You may wish to use the exercises for oral work first. Help pupils use picture line to find answers. "Find 4; find 2. How many more is 4 than 2?" "Find 10; find 3. How many more is 10 than 3?" Ask pupils to write some of the examples in Ex. 1 and 2 as number sentences.

HOW MANY MORE DO YOU NEED?

1.

You want:	You have:	You need how many more?
4	2	2
6	4	2
5	3	2
6	2	4
7	5	2
4	1	3
8	4	4
7	3	4
5	1	4
8	3	5
7	5	2

2.

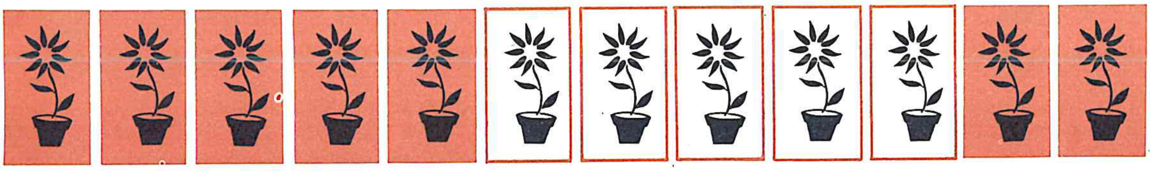
4 = 2 + Δ
7 = 2 + Δ

You want:	You have:	You need how many more?
7	2	5
7	4	3
9	3	6
11	6	5
9	5	4
12	7	5
11	3	8
12	4	8
11	8	3
10	3	7
9	7	2

3. Find the missing numerals.

a. 2 + 9 = 11 3 + 7 = 10 6 + 6 = 12
b. 3 + 5 = 8 9 + 2 = 11 3 + 9 = 12
c. 5 + 7 = 12 8 + 4 = 12 2 + 8 = 10
d. 2 + 7 = 9 4 + 7 = 11 6 + 4 = 10
e. 5 + 6 = 11 4 + 5 = 9 7 + 2 = 9

Point out that in Ex. 3 they can use picture line in the same way.



FOLLOW-UP: Give the class additional practice of a similar nature using problems about money. (G24).

(G24) AIMS: Use relationships; find patterns among number facts as aids to understanding and to mastery; add and subtract one. ACTIVITIES: E1, 2, 3 (G116)

PROCEDURES: Have pupils write answers for the "doubles facts" in Ex. 1. "How much larger is each succeeding sum? Why?" You may wish to write the doubles on the chalkboard.

USING WHAT YOU KNOW

"Why do we call them doubles?"

1.

1	2	3	4	5	6
+1	+2	+3	+4	+5	+6
2	4	6	8	10	12

Find the missing numerals.

2.
2 + 2 = 1 + 3
2 + 2 = 1 + 3
3 + 3 = 2 + 4
3 + 4 = 3 + 3 + 1
4 + 4 = 3 + 5
4 + 5 = 4 + 1 + 4
5 + 5 = 6 + 4
5 + 5 = 4 + 4 + 2
6 + 6 = 5 + 7

Ex. 2. Work through a few orally. "2 + 2 = 4 What can we put with 3 to make 4?"

3.
1 + 2 = 3
2 + 3 = 5
3 + 4 = 7
4 + 5 = 9
5 + 6 = 11
2 + 1 = 3
3 + 1 = 4
4 + 1 = 5
5 + 1 = 6
6 + 1 = 7

Pupils should use the answers for the doubles facts to help them in Ex. 3. 2 + 2 = 4. 1 + 2 will be 1 less, and 2 + 3 will be 1 more. "What happens when we add 1 to any number?"

Call attention to the patterns of the answers in Ex. 3.

4. Find the answers.

a. 2 − 1 = 1   4 − 2 = 2   6 − 3 = 3
b. 8 − 4 = 4   10 − 5 = 5   12 − 6 = 6

In Ex. 4, the same number is left as is subtracted. Help the pupils discover these are inverses of the doubles.

5. Find the answers.

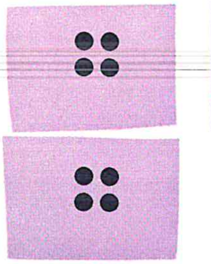
Bring out the relationship between the facts in Ex. 5 and doubles facts in Ex. 4.

a. 5 − 2 = 3   8 − 3 = 5   6 − 4 = 2
b. 4 − 3 = 1   10 − 6 = 4   5 − 3 = 2
c. 3 − 1 = 2   7 − 4 = 3   9 − 5 = 4
d. 11 − 6 = 5   7 − 3 = 4   11 − 5 = 6
e. 12 − 7 = 5   9 − 4 = 5   12 − 5 = 7

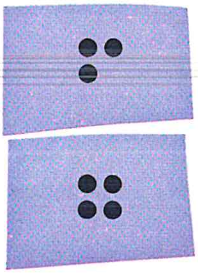
FOLLOW-UP: Have children make number fact cards for the examples they got wrong.

(G24–25) AIMS: Use the relationship between unknown facts and the doubles.
ACTIVITIES: B7, 8, 9 (G110)
PROCEDURES: Have the children study the pictures and tell what numerals go in the frames below. Some children will probably be able to proceed independently.

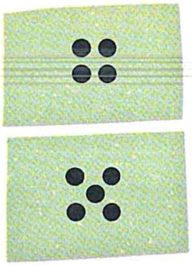
DOUBLES OF FOUR, FIVE, AND SIX



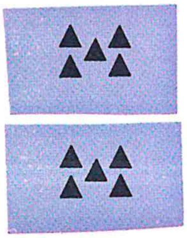
4 + 4 = 8



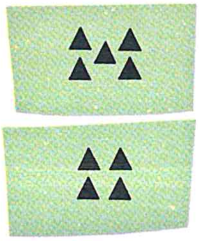
3 + 4 = 7



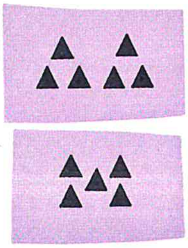
4 + 5 = 9



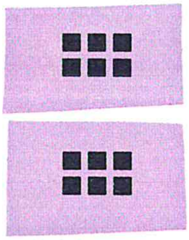
5 + 5 = 10



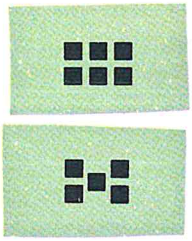
5 + 4 = 9



6 + 5 = 11



6 + 6 = 12



6 + 5 = 11

Find the answers. How do doubles help you?

Guide pupils to compare each example in the row with the double. "Will the answer be larger or smaller? How much?"

1.

4	3	4	4	5
+4	+4	+5	+3	+4
8	7	9	7	9

2.

5	5	6	4	5
+5	+4	+5	+5	+6
10	9	11	9	11

3.

6	6	5
+6	+5	+6
12	11	11

In Ex. 4, guide pupils in thinking whether the answer they want is more than or less than the doubles fact. Ask different children to tell how they used the doubles to help find answers.

4. Use the doubles to help you.

a.

8	7	11	7	10	9	3
−4	−4	− 5	−3	− 5	−4	+4
4	3	6	4	5	5	7

b.

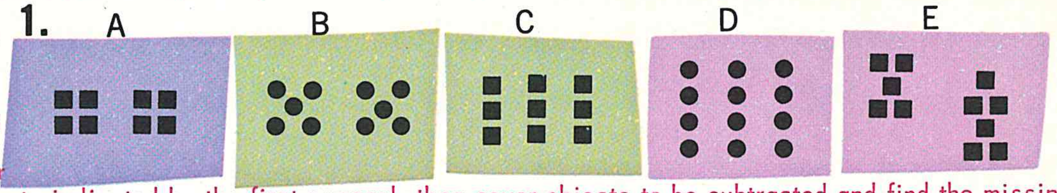
11	9	12	6	4	5
− 6	−5	− 6	+ 5	+ 5	+ 5
5	4	6	11	9	10

FOLLOW-UP: Activities B7, 8, 9 (G110)

(G25) AIMS: Learn to compare subsets as an aid in mastering subtraction.
ACTIVITIES: B6 (G109)
PROCEDURES: In Ex. 1, have the children find how many are in sets A – E and write the answers. They may continue to use A – E, if they need help to complete Ex. 2. In Ex. 3, pupils who need to use the pictures may locate the set having the number of objects indicated by the first numeral, then cover objects to be subtracted and find the missing number.

SETS HELP YOU SUBTRACT

1.



How many in each set? Use a marker to show subsets in each picture.

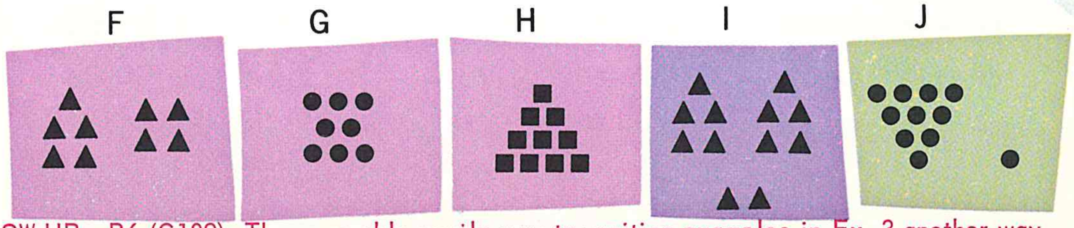
2. Use a marker with the pictures above to find the answers.

a	b	c
8 − 2 = 6	12 − 3 = 9	8 − 6 = 2
10 − 3 = 7	11 − 5 = 6	12 − 6 = 6
9 − 6 = 3	9 − 3 = 6	10 − 4 = 6
12 − 8 = 4	11 − 2 = 9	12 − 9 = 3
11 − 6 = 5	10 − 7 = 3	8 − 6 = 2

3. What is the missing number? Use the pictures below if you need help.

Help pupils think: 11 subtract some number equals 9. You may ask them to show on a picture that their number sentence is true.

a	b	c
11 − 2 = 9	11 − 7 = 4	11 − 4 = 7
9 − 4 = 5	8 − 5 = 3	11 − 3 = 8
10 − 6 = 4	10 − 4 = 6	12 − 2 = 10
8 − 3 = 5	9 − 5 = 4	10 − 7 = 3
12 − 5 = 7	12 − 7 = 5	8 − 6 = 2



FOLLOW-UP: B6 (G109) The more able pupils may try writing examples in Ex. 3 another way.
9 + ☐ = 11, 11 − 2 = 5 + ☐, 11 − 2 = 2 + ☐ and so on.

(G25–26) AIMS: Review the material taught in the chapter.
PROCEDURES: Have pupils write the answers and circle examples for which they did not know the answers immediately, or where they had to count. Review lessons may often be used again after needed reteaching is completed.

DO YOU REMEMBER?

Write the missing numerals.

1. 3 threes = 9 2 fours = 8 2 fives = 10
4 twos = 8 3 twos = 6 5 twos = 10

2. 10 − 5 = 5 8 − 4 = 4 6 − 3 = 3
4 + 4 = 8 3 + 3 = 6 5 + 5 = 10

3. Find the answers.

5	3	8	6	3	5	4	2	1
4	4	2	3	3	2	2	2	2
2	5	2	2	3	3	3	4	1
11	12	12	11	9	10	9	8	4

4.

2 tens = 20 15 tens = 150 110 = 11 tens
5 tens = 50 13 tens = 130 120 = 12 tens
10 tens = 100 12 tens = 120 140 = 14 tens

5. Find the missing numerals.

one hundred four = 1 hundred + 0 tens + 4 ones
one hundred fifty = 1 hundred + 5 tens + 0 ones
118 = 1 hundred + 1 tens + 8 ones
127 = 1 hundred + 2 tens + 7 ones

6.

8 = 4 twos 6 = 2 threes 12 = 4 threes
8 = 2 fours 4 = 2 twos 9 = 3 threes
6 = 3 twos 10 = 2 fives 12 = 2 sixes

FOLLOW-UP: E7–10 (G118).

(G26) AIMS: Check children's mastery of addition and subtraction facts.
PROCEDURES: Set up a test situation which will enable each child to work without help on these two pages. Urge pupils to circle answers which they could not think of immediately, or where they had to count. See G64 for suggested individual records.

DO YOU KNOW?

Write the missing numerals.

1.	2	6	2	4	8	5	4
	+4	+3	+8	+6	+3	+3	+3
	6	9	10	10	11	8	7

2.	2	6	3	3	2	6	2
	+7	+5	+7	+4	+9	+4	+5
	9	11	10	7	11	10	7

3.	4	5	2	3	7	4	5
	+7	+4	+6	+8	+4	+5	+6
	11	9	8	11	11	9	11

4.	3	7	3	6	5	8	8
	+5	+3	+6	+2	+2	+1	+2
	8	10	9	8	7	9	10

5.	7	6	10	11	8	10	10
	−3	−4	− 7	− 9	−3	− 6	− 8
	4	2	3	2	5	4	2

6.	**a**	**b**	**c**
	5 + 6 = 11	5 + 3 = 8	5 + 3 = 8
	4 + 5 = 9	2 + 9 = 11	3 + 6 = 9
	4 + 7 = 11	4 + 6 = 10	7 + 2 = 9
	3 + 8 = 11	7 + 3 = 10	4 + 6 = 10

7.	9	9	11	7	11	10	9
	−3	−7	− 5	−4	− 3	− 4	−5
	6	2	6	3	8	6	4

Continue on page 40.

You may wish to take more than one lesson period for these end-of-chapter tests.

8. $\begin{array}{r} 10 \\ -\ 3 \\ \hline ⑦ \end{array}$ $\begin{array}{r} 11 \\ -\ 8 \\ \hline ③ \end{array}$ $\begin{array}{r} 7 \\ -5 \\ \hline ② \end{array}$ $\begin{array}{r} 8 \\ -6 \\ \hline ② \end{array}$ $\begin{array}{r} 11 \\ -\ 4 \\ \hline ⑦ \end{array}$ $\begin{array}{r} 11 \\ -\ 6 \\ \hline ⑤ \end{array}$ $\begin{array}{r} 9 \\ -4 \\ \hline ⑤ \end{array}$

9. $\begin{array}{r} 9 \\ -6 \\ \hline 3 \end{array}$ $\begin{array}{r} 8 \\ -5 \\ \hline 3 \end{array}$ $\begin{array}{r} 11 \\ -\ 7 \\ \hline 4 \end{array}$ $\begin{array}{r} 8 \\ -2 \\ \hline 6 \end{array}$ $\begin{array}{r} 6 \\ -3 \\ \hline 3 \end{array}$ $\begin{array}{r} 10 \\ -\ 9 \\ \hline 1 \end{array}$ $\begin{array}{r} 7 \\ -2 \\ \hline 5 \end{array}$

10. $8 + 3 = \boxed{11}$ $9 + \boxed{2} = 11$ $4 + \boxed{4} = 8$

$10 + 2 = \boxed{12}$ $6 + \boxed{4} = 10$ $6 + \boxed{5} = 11$

$7 + 3 = \boxed{10}$ $5 + \boxed{4} = 9$ $8 + \boxed{2} = 10$

$8 + 1 = \boxed{9}$ $7 + \boxed{4} = 11$ $10 + \boxed{1} = 11$

11. $10 - \boxed{4} = 6$ $9 - \boxed{7} = 2$ $10 - \boxed{3} = 7$

$11 - \boxed{5} = 6$ $8 - \boxed{3} = 5$ $11 - \boxed{3} = 8$

$11 - \boxed{7} = 4$ $8 - \boxed{6} = 2$ $11 - \boxed{9} = 2$

$9 - \boxed{3} = 6$ $11 - \boxed{4} = 7$ $10 - \boxed{8} = 2$

$8 - \boxed{2} = 6$ $11 - \boxed{8} = 3$ $9 - \boxed{5} = 4$

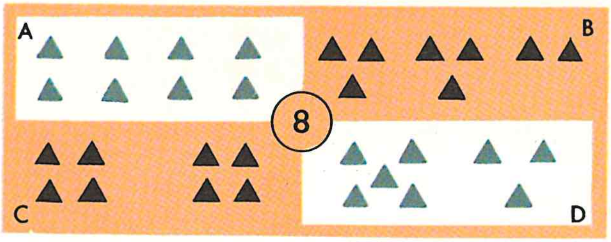
Did you know all the answers right away?
Make cards for the facts you did not know.

FOLLOW-UP: Have children make study cards for facts on which further practice is needed. Following guided practice sessions, repeat the test for those pupils whose control of facts is weak.

(G26) AIMS: Explore sets of 9 – 11 objects, find subsets of 2, 3, 4, and 5. Use sets as aid in learning the addition, subtraction, multiplication, and division facts.
ACTIVITIES: B10, 11, 13 (G110) Lesson may be used for independent work, for class discussion, or with pupils working in pairs.
PROCEDURES: When pupils have identified the subsets for Ex. 1, they should be able to answer the questions. Children working in pairs may take turns asking the questions orally.

ENRICHMENT

1.



Picture 1

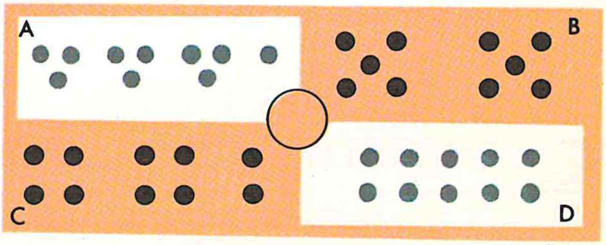
How many ▲s in box A? 8
How many 2's? 4
How many ▲s in box B? 8
How many 3's? 2 How many ▲s are left? 2

How many 4's in box C? 2
How many 5's in box D? 1 How many ▲s are left? 3

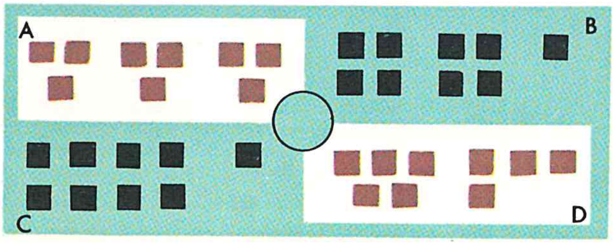
2.

Picture 2

How many ●s in each box? 10



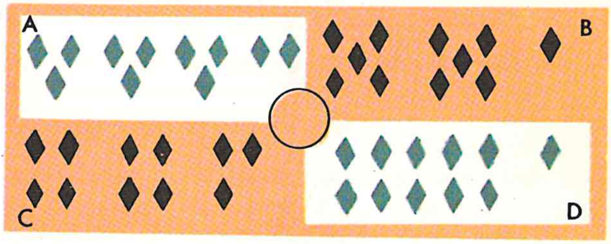
3.



Picture 3

How many ■s in each box? 9

4.



Picture 4

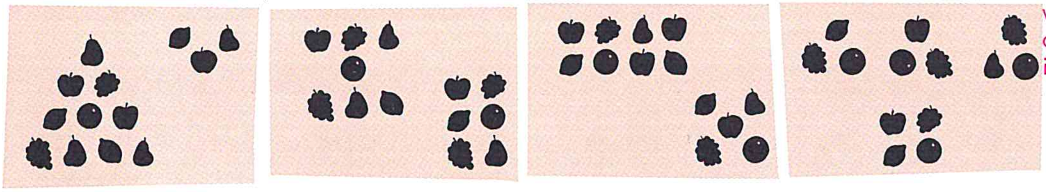
How many ◆s in each box? 11

Tell about the subsets of 2's, 3's, 4's, or 5's in each box.

FOLLOW-UP: Use experiences listed in Teaching Suggestions (G26).

(G28) AIMS: Learn addition facts with sums of 13.
ACTIVITIES: A3–10 (G106)
PROCEDURES: In discussing the pictures ask pupils to tell what numeral goes in each frame. Point out that a set may have unlike objects. Have pupils use markers to show other combinations. They may cover or ignore one object when they are thinking of 12.

EXPLORING THIRTEEN



10 + 3 = 13   7 + 6 = 13   8 + 5 = 13   9 + 4 = 13

1. How many things in each picture?

2. Complete the number sentences.

Have individuals show the facts in 2a with their markers. Use b–e as written work. Later these can be used as an oral exercise.

a. 3 + 10 = 13   4 + 9 = 13   5 + 8 = 13

b. 4 + 4 + 4 = 12   4 + 4 + 5 = 13

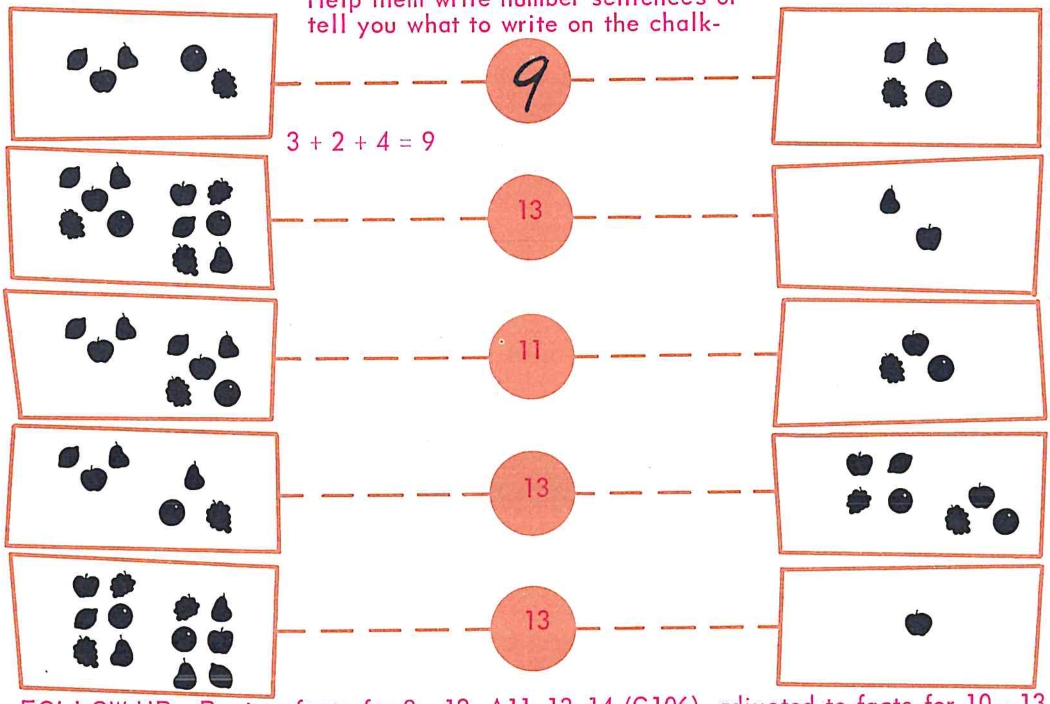
c. 5 + 5 + 2 = 12   5 + 5 + 3 = 13

d. 10 + 2 + 1 = 13   9 + 2 + 1 = 12

e. 6 + 6 + 1 = 13   5 + 6 + 1 = 12

3. Write the numeral for each pair of pictures.

In Ex. 3 work through the first example with the children. They may then find the other missing numerals and write them on their papers. Help them write number sentences or tell you what to write on the chalkboard. Lead pupils to see they must add all the subsets to get the total in the center.



FOLLOW-UP: Review facts for 8 – 12. A11, 13, 14 (G106), adjusted to facts for 10 – 13.

(G28) AIMS: Develop generalizations on the addition or subtraction of 0 and 1; practice number facts with sums or minuends of 10, 11, 12, 13.
ACTIVITIES: H1, 2 (G121)
PROCEDURES: As children complete the exercises encourage them to state in their own words a rule for adding or subtracting 0 and 1.

ZERO AND ONE

1. **a.** Add 1 to each number.

9 + 1 = 10
10 + 1 = 11
11 + 1 = 12
12 + 1 = 13

"Add 1 to 4, 5, 6. Does the same thing happen?"

b. Subtract 1.

5 − 1 = 4
6 − 1 = 5
7 − 1 = 6
8 − 1 = 7

"Subtract 1 from 10, 9, 12. Can you make a rule?"

Tell what happens when you add 1 to a number; when you subtract 1.

2. **a.** Add 0 to each number.

9 + 0 = 9
10 + 0 = 10
11 + 0 = 11
12 + 0 = 12

b. Subtract 0.

5 − 0 = 5
6 − 0 = 6
7 − 0 = 7
8 − 0 = 8

"What number can you add or subtract without changing your first number?"

Children may copy examples or use answer strips.

Tell what happens when you add 0 to a number; when you subtract 0.

3. Find the answers.

Ex. 3 – 4 could be independent work for some pupils while you work with others.

6	9	7	10	9	4	5
+7	+2	+5	+ 3	+3	+7	+8
13	11	12	13	12	11	13

4. Write the missing numerals.

a.

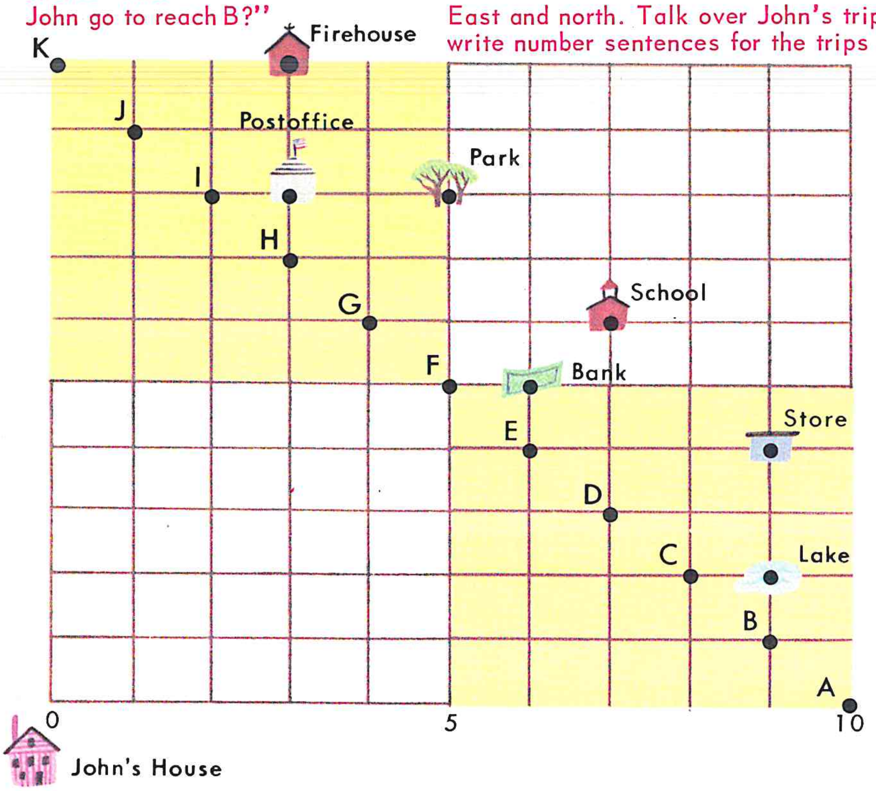
11	12	13	12	11	11	10
− 9	− 6	− 4	− 9	− 8	− 1	− 2
2	6	9	3	3	10	8

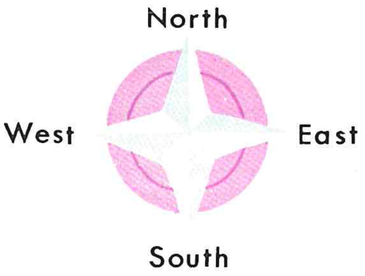
b. 7 + 5 = 12 5 + 6 = 11 3 + 10 = 13

FOLLOW-UP: H3 (G121).

(G28–29) AIMS: Explore addition facts with sums of 10, 11, 12, 13; find missing addends for number facts with sums 10 – 13. ACTIVITIES: B10a–c, 11 (G110)
PROCEDURES: Ask if anyone knows which way is north. Discuss directions around the school. Point out north and east on the chart. "What directions does John go to reach B?" East and north. Talk over John's trips to each letter. Help children write number sentences for the trips as shown in Ex. 2. "What did you discover about the answers?" (Each is 10.)

USING FACTS WITH DIRECTIONS





1. How many blocks east must John go to get to point A? 10
   How many blocks east and how many blocks north does he go to point C? 8 and 2
2. John makes a trip to each letter. Show how far he goes. Help pupils set up papers to record answers as shown.

Trip to:	East	North	Altogether
A	10	0	10 + 0 = 10
B	9	1	9 + 1 = 10

Show each trip this way.

Continue on page 45.

Ask the children to find the school in the picture. "How many blocks east and north?" Help them decide what numerals complete number sentences showing how he went to school.

3. How far does John walk to school?

7 blocks east and 6 north   7 + 6 = 13

Could he walk north, then east?   6 + 7 = 13

Write number sentences to show how far he walks to the park; the store; the firehouse. 5 + 8; 9 + 4; 3 + 10 = □

Give help with the number sentences to show the distances to all the other places marked on the chart.

4. Find these places on the picture.

3 blocks east and 10 blocks north	3 + 10 = 13
3 blocks east and 8 blocks north	3 + 8 = 11
6 blocks east and 5 blocks north	6 + 5 = 11
9 blocks east and 2 blocks north	9 + 2 = 11

You may wish to have the children complete Ex. 5 orally. Review the directions south and west on the chart. Guide pupils in seeing that the frame tells how many blocks he went west. 6 (south) + 7 (west) = 13

5. Going home John walked 10 blocks.

He walked 6 blocks south ↓ .

How many blocks west (←) did he walk?

Find the missing number of blocks.

13	12	10	11	12	13	12
6 ↓	7 ↓	2 ↓	3 ↓	4 ↓	8 ↓	4 ↓
← 7	← 5	← 8	← 8	← 8	← 5	← 8

Bring out inverses.

Explain that exercises a–f stand for trips that John made.

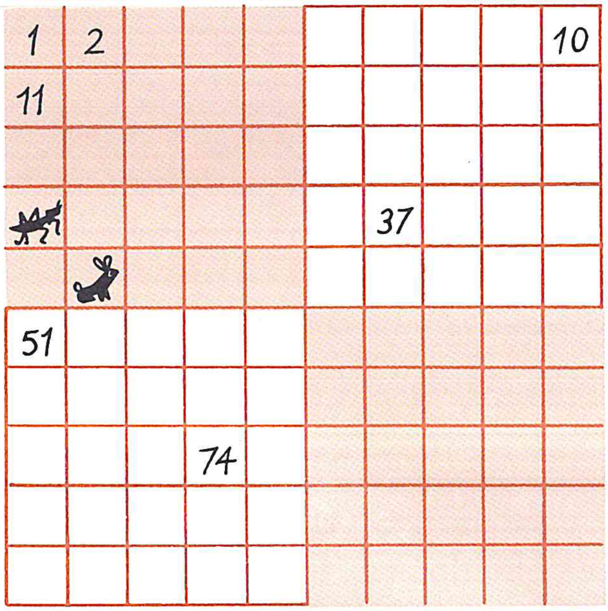
6. How many blocks?

	East	North	Altogether		East	North	Altogether
a.	4	6	10	**d.**	4	9	13
b.	5	7	12	**e.**	8	4	12
c.	3	8	11	**f.**	8	2	10

FOLLOW-UP: Encourage children to originate similar number patterns for trips for John.

(G29–31) AIMS: Understand the meaning of tens and ones; add and subtract tens and ones; solve problems. ACTIVITIES: D1, 4, 5, 11, 12a–b, 13 (G114)
PROCEDURES: Explain that Hopper is the rabbit. Skipper is his friend, a grasshopper. Have pupils use their markers on the 10 × 10 block to show 2 tens, 5 tens, and so on. Ex. 1 may be oral or written.

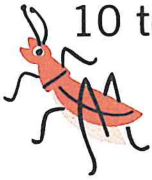
ADD AND SUBTRACT TENS



1. How many squares in 1 row? in 2 rows?

4 tens = 40
3 tens = 30
7 tens = 70
9 tens = 90
8 tens = 80
6 tens = 60
10 tens = 100

"When Hopper moves from 2 to 12 how many squares does he go?" Discuss the possibility of moving 10 squares in 10 jumps or 10 squares in 1 jump.



Hopper and Skipper move down ↓ or up ↑ from one row to the next.

You may wish to use a chalkboard illustration to explain procedure for Ex. 2. Explain the use of the arrows.

2. Hopper is on 42.
He moves down ↓ 3 rows.
He moves down ↓ 2 rows.
Where is he? 92

Skipper is on 31.
He moves down ↓ 4.
He moves down ↓ 1.
Where is he? 81

Pupils will find it helpful to use markers to keep track of the positions in Ex. 2 and 3. Two children could show on the class 100 board various moves for the animals.

3.

	Hopper	Skipper	Hopper	Skipper
Starts at	22	56	28	16
	↓ 2	↓ 1	↑ 2	↑ 3
	↓ 3	↓ 3	↑ 3	↑ 2
	72	96	Starts at 78	66

Continue on page 47.

In Ex. 4–6 discuss how Hopper and Skipper make their trips in various hops, as 3 + 3 and so on. Be sure pupils understand that in the same sentence, like frames take the same numeral. Help the children use frame sentences to work out the hops, or show hops on the chart on page 46.

$32 + \square = 38$
$32 + \square + \Delta = 38$
$32 + \square + \Delta + \nabla = 38$

If the hops are equal they may write:

$32 + \underset{3}{\square} + \underset{3}{\square} = 38$

$32 + \underset{2}{\square} + \underset{2}{\square} + \underset{2}{\square} = 38$

Use the picture on page 46 to help you.

Answers will vary.

4. Hopper is on 32. He can hop to 38 in 1 hop; in 2 hops; in 3 hops. Tell how many squares he would go each time.

5. Skipper is on 70. He can hop to 80 in 1 hop; in 2 hops; in 3 hops. Tell how many squares he hops.

6. Hopper is on 60. He can hop to 66 in 1 hop; in 2 hops; in 3 hops. Tell how many squares he hops.

7. Hopper hops right →. Skipper hops left ←. Where do they land?

Explain the arrows and numerals that show the hops.

Start

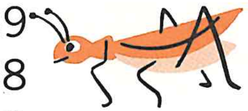
$21 \xrightarrow{4} 25 \xleftarrow{2} 27$

$32 \xrightarrow{6} 38 \xleftarrow{1} 39$

$82 \xrightarrow{3} 85 \xleftarrow{3} 88$

$90 \xrightarrow{5} 95 \xleftarrow{4} 99$

Start



When he hops left, we subtract.

8. This time they hop down ↓ and left ←. Where do they land?

Remind children when they hop down they add 10 each time.

Hopper

Start

$$\begin{tikzcd} & 57 \arrow[d, "2"] \\ 74 & \arrow[l, "3"'] \end{tikzcd}$$

Skipper

$$\begin{tikzcd} & 28 \arrow[d, "2"] \\ 44 & \arrow[l, "4"'] \end{tikzcd}$$

Hopper

$$\begin{tikzcd} & 36 \arrow[d, "5"] \\ 83 & \arrow[l, "3"'] \end{tikzcd}$$

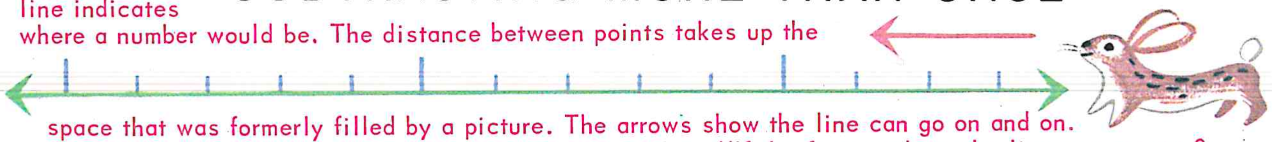
Skipper

$$\begin{tikzcd} & 19 \arrow[d, "6"] \\ 72 & \arrow[l, "7"'] \end{tikzcd}$$

FOLLOW-UP: See if the children can follow instructions and make up some trips from oral directions.

(G31–32) AIMS: Teach use of number line; practice successive subtraction.
ACTIVITIES: E1 (G116)
PROCEDURES: Develop understanding of a number line. Compare with the picture lines they have been using. Each point on the line indicates where a number would be. The distance between points takes up the space that was formerly filled by a picture. The arrows show the line can go on and on. "If the first mark on the line represents 0, where is 1, 2, 5?" What does the last mark stand for? (13) Draw a number line on the chalkboard and mark 0 – 13. Use some chalkboard illustrations. Make clear that moving from right to left indicates subtraction.

SUBTRACTING MORE THAN ONCE



Find the picture of Hopper.

He is going to hop to the left.

1. Find where Hopper lands.

He starts at: He lands at:

a. 12 − 2 − 2 − 2 − 2 = 4

b. 13 − 2 − 2 − 2 − 2 = 5

c. 12 − 3 − 3 − 3 − 3 = 0

d. 13 − 3 − 2 − 3 − 2 = 3

e. 11 − 4 − 2 − 3 = 2

f. 10 − 2 − 5 − 1 − 1 = 1

"How can we show addition?" (left to right)

Show Hopper's jumps as:
12 − 2 = 10, 10 − 2 = 8,
8 − 2 = 6, 6 − 2 = 4.
He lands on 4.

2. Hopper starts at 11 and lands at 3.
How far did he hop? 8
What 2 hops could he take?
Show them another way.

4 + 4, 5 + 3, 6 + 2, 7 + 1, or the reverses. Note: See also suggestions (G31–32).

3.

He starts at:	He lands at:	
12	4	8
13	2	11
10	0	10
11	2	9
13	3	10

How far did he hop each time?

Continue on page 49.

In Ex. 4 and 5 encourage children to use the number line on the chalkboard or page 48 if they need it to work out answers. In Ex. 6 and 7 each example will need to be worked four times using each of the numerals in the square by turns.

4.

	Hopper is at:	How far is he from:	
a.	12	9	3
b.	13	10	3
c.	11	9	2
d.	13	8	5
e.	12	10	2
f.	10	7	3

Let different children show on the number line where Hopper is, where he wants to go, and tell how far he must hop.

5.

	Hopper is at:	He wants to be at:	He hops:
a.	10	5	5
b.	11	2	9
c.	13	4	9
d.	12	1	11
e.	13	3	10
f.	12	3	9

In these two exercises the pupils see the set of numerals with the mathematical set notation. If they are ready to understand this symbol, call it to their attention.

6. Use each of these numerals for the ■.

$\{13, 12, 11, 10\}$ ■ − ▲ = 10

Complete each number sentence.

13 − 3 = 10 11 − 1 = 10
12 − 2 = 10 10 − 0 = 10

7. Use each of these numerals for the ■.

$\{10, 11, 12, 13\}$ ■ − ▲ = 1

Complete each number sentence.

10 − 9 = 1 12 − 11 = 1
11 − 10 = 1 13 − 12 = 1

FOLLOW-UP: Encourage the children to work out other trips for Hopper.

(G32) AIMS: Practice with vertical and horizontal forms of addition and subtraction.
ACTIVITIES: B 2a–b; D 7–9 (G108)
PROCEDURES: This page may be used as written work after preliminary oral discussion of the several types of examples. Review adding and subtracting tens demonstrating on a 100 chart. Provide similar oral examples.

ADDING AND SUBTRACTING

Write the answers.

1.

2 tens	6 tens	7 tens
+4 tens	+3 tens	+2 tens
6 tens	9 tens	9 tens

Call attention to the first two examples in 2 a and b. Stress the basic fact involved in each time.

2. a.

4	54	63	71	33	87	21
+5	+ 5	+ 4	+ 6	+ 3	+ 2	+ 8
9	59	67	77	36	89	29

b.

8	88	95	57	39	62	46
−3	− 3	− 5	− 6	− 4	− 1	− 4
5	85	90	51	35	61	42

Remind pupils of Hopper's jumps using a number line or 100 chart.

3.

a	b
61 + 2 + 3 = 66	94 + 1 + 1 = 96
32 + 1 + 4 = 37	75 + 2 + 1 = 78
43 + 2 + 0 = 45	22 + 4 + 2 = 28

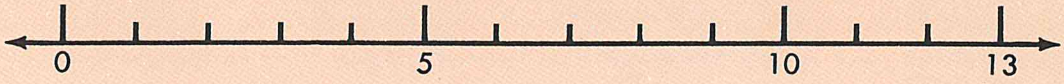
4.

a	b	c
86 − 3 = 83	33 + 6 = 39	75 − 3 = 72
62 − 2 = 60	55 + 4 = 59	76 − 3 = 73
87 − 4 = 83	22 + 7 = 29	77 − 3 = 74
45 − 2 = 43	61 + 8 = 69	76 + 3 = 79
29 − 6 = 23	44 + 1 = 45	75 + 3 = 78

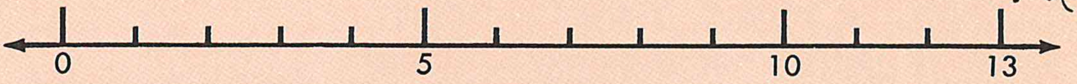
FOLLOW-UP: D 1a–e, 2, 4, 5, 6 (G114)

(G32–33) AIMS: Practice successive addition and subtraction in the same example; practice addition and subtraction facts. ACTIVITIES: E 1–5, 7–10 (G116)
PROCEDURES: Check on children's reading of plus and minus. Discuss the number line, how far it goes, what points are marked. After exploring the number line, explain that Ex. 1–6 represent 6 games. Children should find the answers, write numerals for the frames and write H, S, or T. (for tie). Explain winner.

PRACTICE WITH PLUS AND MINUS



Help pupils follow the moves of the games on the two number lines.



Sometimes Hopper and Skipper play a game.
Each has 4 hops.
The winner is the one nearer zero.
Write S for Skipper, H for Hopper, T for tie. Winner

Operations are to be performed in the order given.

1. 12 − 2 + 1 − 2 + 1 = 10
12 − 3 + 2 − 3 + 2 = 10 T

2. 13 − 4 + 2 − 4 + 2 = 9
11 − 3 + 2 − 3 + 2 = 9 T

3. 13 − 5 + 3 − 6 − 1 = 4
10 + 3 − 6 + 1 − 5 = 3 S

4. 11 + 2 − 5 + 2 − 4 = 6
11 − 4 + 1 − 5 + 2 = 5 S

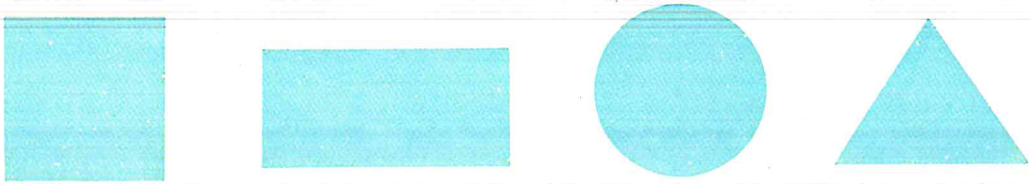
5. 12 − 4 + 4 − 3 + 3 = 12
12 − 3 + 3 − 5 + 5 = 12 T

6. 13 − 6 + 3 − 6 − 3 = 1
12 − 5 + 3 − 5 + 3 = 8 H

FOLLOW-UP: Have pupils plan games to show they know their number facts.

(G33) AIMS: Develop recognition of the square, rectangle, circle, and triangle. Develop reading vocabulary.
ACTIVITIES: 1 1, 2, 7 (G121)
PROCEDURES: You will want to be aware of the difference between a square and a rectangle before discussing these shapes with the class. See discussion on G33.

MATCHING SHAPES



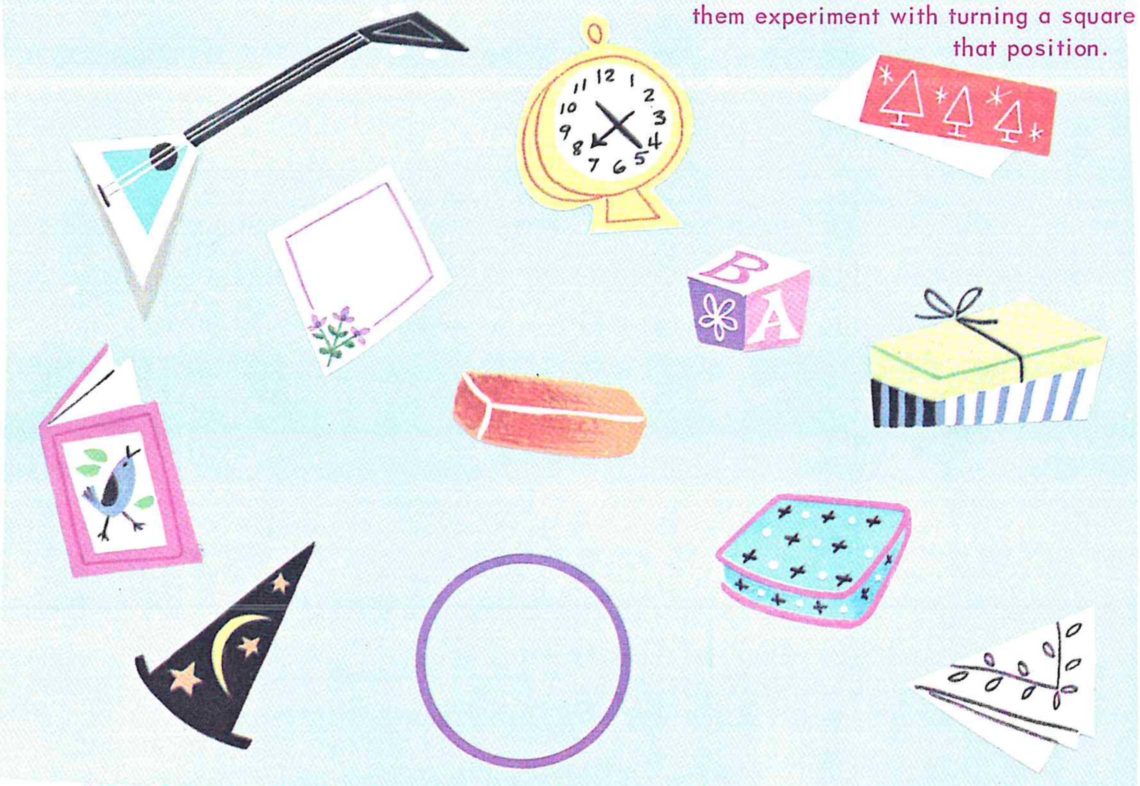
Question children about the length of the sides of A and B. "Are they alike? Which has the four sides alike?" (square)

1. Show the square. Show the circle.
2. What picture has 3 sides? 4 sides?
3. Look at the pictures below.
   Find one that looks like D.
   Find two that are like B.
   Which are like C?

Ex. 3. Explain that resemblance need not be exact; also things at a distance look different from things nearby.

Examine all sides of square and rectangle.

Have pupils name objects which remind them of these shapes. If children suggest diamond shape, let them experiment with turning a square in that position.

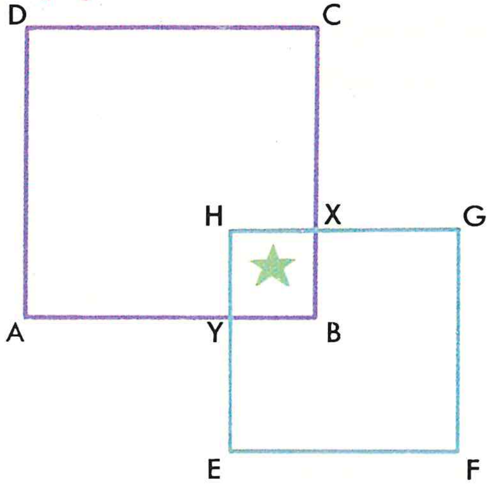


FOLLOW-UP: Use familiar objects to sharpen pupil's awareness of shapes. Find objects in the classroom that are similar shapes.

(G34) AIMS: Explore pictures of shapes, and points inside and outside; develop beginning concepts of a line.
ACTIVITIES: I1, 2, 5, 6, 7 (G121)

PROCEDURES: It is not necessary that pupils become aware of a line as an abstraction at this time (G34), but some knowledge of geometric shapes is valuable. Develop vocabulary. Guide the children to read the exercises. Help them find ABCD. Give practice on naming figures with letters.

SQUARES AND OTHER SHAPES



1. The large square is named ABCD.

Find two other squares in this picture.

What letters name these two squares?

Name a line that crosses another line.

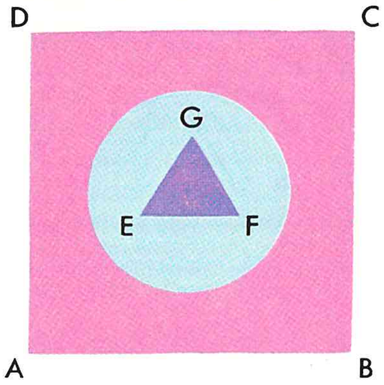
Name a line that does not cross another line.

Accept any correct answers. Order of letters may vary.

Is the star inside a square?

Yes

Build understanding of words, "inside" or "outside," "above" and "below."



2. What letters name this square? ABCD

Where is the ● ?

Where is the ▲ ?

How many lines make a ■ ? 4

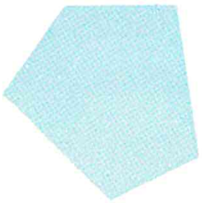
How many lines make a ▲ ? 3

Have pupils notice the rebus pictures in exercise.

Draw similar shapes on chalkboard and use letters on sides if pupils need help.

3. How many sides has each picture?

Give some practice in drawing with a ruler. See suggestions (G34).



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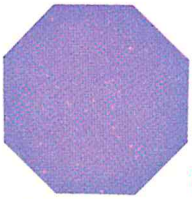

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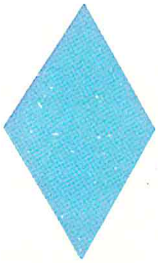

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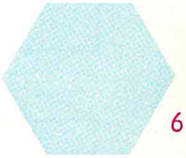
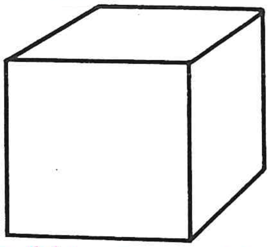


6

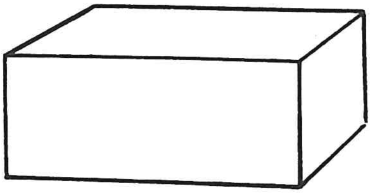
G34–35) AiMS: Determine the number of faces, corners, and edges on a cube.
ACTIVITIES: 13–7 (G122)
PROCEDURES: Show the cube to the class. Have pupils identify the shape of one face of the cube (a square). Explain terms as needed. Guide them to examine all faces of the cube for shape and size. Lead them to determine the number of faces on the cube, the number of edges and the number of corners.

FACES, CORNERS, EDGES



1. How many faces? 6
How many edges? 12
How many corners? 8

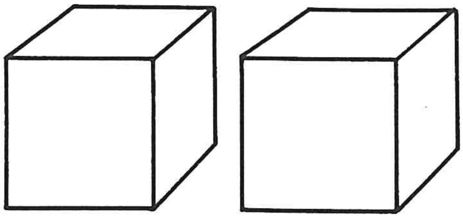
Be careful to use correct terms and encourage pupils to use them.



2. How many faces like this ▭? 4
How many faces like this □? 2
How many edges? 12
How many corners? 8

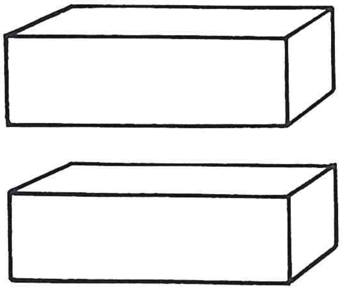
Demonstrate with a chalkbox.

Guide the pupils to see cube and rectangular box have the same number of faces, edges, and corners.



3. How many faces have two boxes? 12
How many corners have two boxes? 16

Have children compare other square and rectangular prisms.



4. How many faces like this □ have these two boxes? 4
How many faces like this ▭? 8

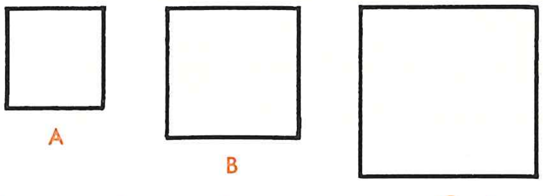
FOLLOW-UP: Challenge children to see if they can find any exception to the rule of 6 faces, 8 corners, and 12 edges for square and rectangular prisms.

(G35–36) AIMS: Observe details, compare sizes, locate points inside and outside; practice recognizing objects larger than, or smaller than others.

ACTIVITIES: 11–7 (G121)

PROCEDURES: Guide the pupils in a general discussion of the first set of squares to see that A is smaller than B; A and B are smaller than C; B is larger than A; and C is larger than B; B and C are larger than A.

COMPARING FIGURES



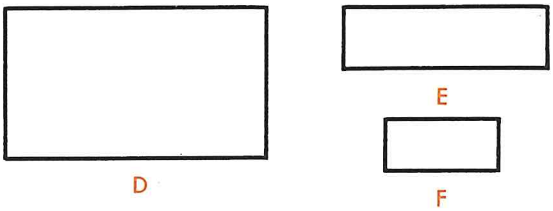
1. Write the answers.

A is smaller than B.

B is larger than A.

A or B is smaller than C.

Follow a similar procedure in comparing the rectangles.



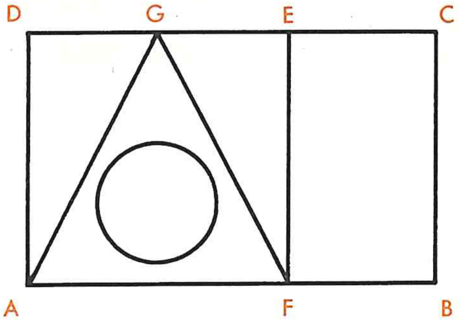
2. Write the answers.

D is larger than E .

E is larger than F .

F is smaller than E or D

In Ex. 3, after pupils have discovered the shapes, have them name them with letters.



3. Tell the answers.

Find the □ . DAFE

Find the ▭. DABC, or DAFE, or EFBC

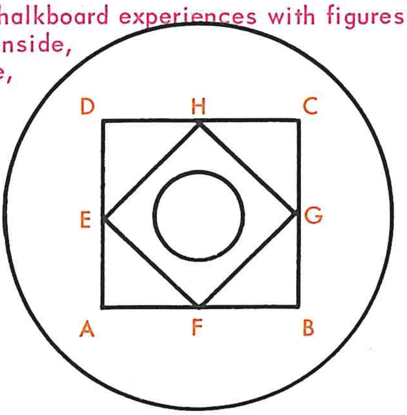
What is inside the □ ? triangle and/or

What is inside the △ ? circle

circle

What is inside the large ▭ ? square, triangle, circle

Give chalkboard experiences with figures of different sizes inside, outside, and so on.



4. Tell the answers.

How many ○ ? 2

How many □ ? 2

How many △ ? 4

What is inside the ◇ ? circle

What is outside the ◇ ? square and large circle

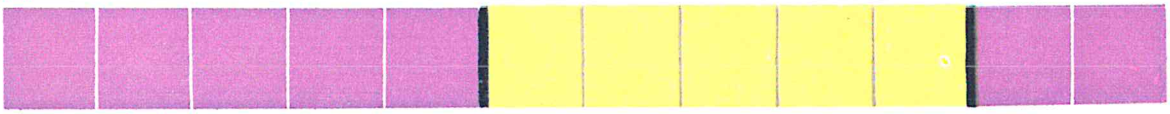
Accept diamond as a square and show class how to turn book so this is plain.

(accept 1 as correct)

FOLLOW-UP: Provide a work sheet for similar exercises, or extend any of the activities.

(G36) AIMS: Begin to develop the idea of square measure.
ACTIVITIES: Have pupils name the shapes on the page. Point out objects of like shape.
PROCEDURES: The children should use strips of ½ inch squares to work out answers for Ex. 2. Use picture line to help with Ex. 1. Discuss number of squares in line.

MEASURE WITH SQUARES



"Find 2 squares; 2 more; 2 more. How many altogether?"

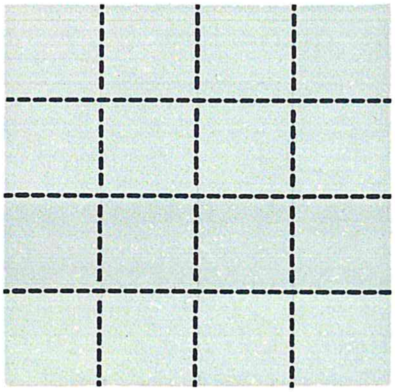
1. How many?

a. 3 twos = 6 2 sixes = 12 2 threes = 6
b. 3 threes = 9 2 fours = 8 6 twos = 12
c. 3 fours = 12 2 twos = 4 5 twos = 10
d. 2 fives = 10 1 fours = 4 10 ones = 10

2. Use your $\frac{1}{2}$ inch squares.
Measure each picture with squares.
How many squares fit picture A? 16
How many in each row? 4 How many rows? 4
Can you measure B, C, D, E with squares? "Why not C and E?"

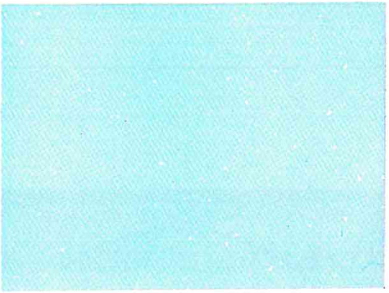
Guide the pupils in measuring the pictures with their strips of squares. (G 36)

A



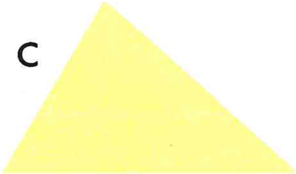
Have them name the shapes.
"How many sides has each shape?"

B

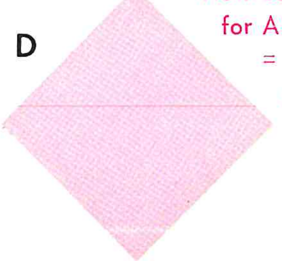


"How could you write a number sentence for A?" 4 + 4 + 4 + 4 = 16 or 4 fours = 16. Do the same for B and D. Accept any variation which gives correct answer.

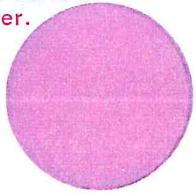
C



D



E



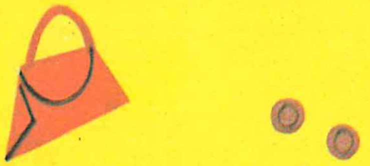
FOLLOW-UP: Measure some other small objects with squares.

(G36–37) AIMS: Solve pictured problems with only part of data given.
ACTIVITIES: A14, 15; B 5, 6 (G107)
PROCEDURES: Explain that you will read the number problems aloud. (See G36–37). Each problem has a picture which will help them find the answer. Work through Ex. 1–4 orally before asking children to write number sentences.

SOLVING PROBLEMS

Make your own problems.

1.

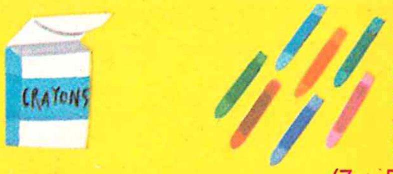


(10 – 2 = 8)

Sue has 10 pennies.

"Two are outside, how many are inside purse?"

2.

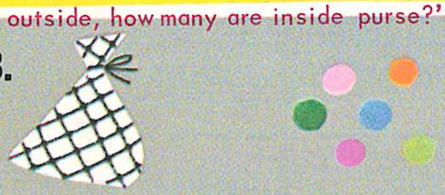


"How many can you see?"

(7 + 5 = 12)

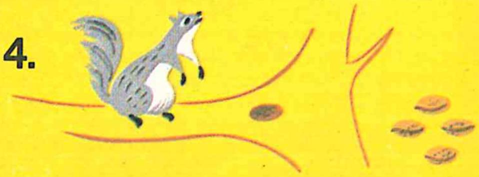
Twelve crayons were in the box.

3.



Bill has 6 marbles in the bag. (6 + 6 = 12)

4.

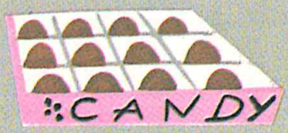


The squirrel has 7 nuts in the hole. (7 + 4 = 11)

Children may write number sentences for 5 – 8.

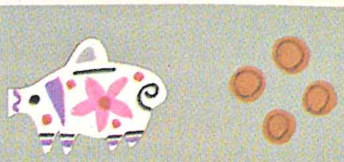
5.

Answers to Ex. 5 will vary.



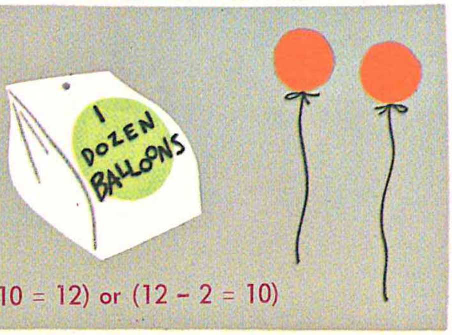
Tell a story.

6.



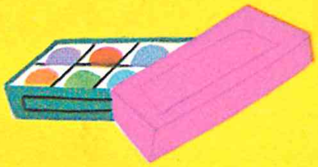
Alice put 9 pennies in her bank. (9 + 4 = 13)

7.



(2 + 10 = 12) or (12 – 2 = 10)

8.



There are 12 balls in the box. (12 – 6 = 6) or (6 + 6 = 12)

FOLLOW-UP: Encourage children to originate problem situations in which a part is missing.

(G37–38) AIMS: Select numerals to replace frames in number sentences; practice facts.
ACTIVITIES: B5, 6, 13, 14 (G109)
PROCEDURES: In Ex. 1–3, the children will use each of the numerals for the square as suggested in order to find the numerals for the circle. Answers may be oral or written.

FINDING THE MISSING PARTS

Give chalkboard illustrations to make directions clear.

1. Two ■'s + 3 = ●

Find the numeral for the ●
if ■ = 1; if ■ = 2; 3; 4; 5.

Two 1's + 3 = 2 + 3 = 5

■	●	
1	5	
2	7	two 2's + 3 = 7
3	9	two 3's + 3 = 9
4	11	two 4's + 3 = 11
5	13	two 5's + 3 = 13

Encourage pupils to share their thinking ways.

2. Four ■'s − 4 = ●

■	●
1	0
2	4
3	8

3. Three ■'s − 6 = ●

■	●
2	0
3	3
4	6

Discuss the patterns of the answers. Urge pupils to figure out why the answers have patterns.

4. ■ − 3 + 5 = ●

■	●
10	12
9	11
8	10
7	9
6	8

5. ■ + 5 + 3 = ●

■	●
2	10
5	13
4	12
1	9
3	11

Exercises may be varied by substituting different numerals. In Ex. 1, for example, have ☐ = 6, 8, 10.

In Ex. 6 the answers for the circle are given. In a given open sentence, all like frames are placeholders for the same numeral.

6. This time you know the answers for ●.
What doubles go in ■ + ■?
6 + 6 = 12 →

■ + ■	●
6 + 6	12
5 + 5	10
4 + 4	8
3 + 3	6

FOLLOW-UP: Use more chalkboard exercises similar to those on the page if needed.

(G38) AIMS: Review addition facts with sums through 12 and related subtraction facts.
PROCEDURES: Use as written work.

DO YOU REMEMBER?

Find the answers.

1. 10 − 2 − 3 − 2 = ■ 3
13 − 1 − 2 − 3 = ■ 7
12 − 2 − 1 − 2 = ■ 7
6 + 2 + 3 + 1 = ■ 12
5 + 4 − 1 + 2 = ■ 10
11 − 1 − 2 − 3 = ■ 5

2. 4 twos = 11 − ■ 3
3 threes = 11 − ■ 2
1 five = 10 − ■ 5
2 fours = 13 − ■ 5
1 seven = 13 − ■ 6
4 threes = 13 − ■ 1

3. 2 tens = ■ 20
4 tens = ■ 40
5 tens = ■ 50
3 tens = ■ 30
9 tens = ■ 90
10 tens = ■ 100

4. 10 = 13 − ■ 3
1 = 12 − ■ 11
0 = 10 − ■ 10
12 − 12 = ■ 0
11 − 1 = ■ 10
13 − 1 = ■ 12

You may wish children to write complete number sentences for all parts of Ex. 5−8.

5. 12 = ■ + ● Find the numeral for ● when ■ = 3; when ■ = 5, 7, or 9.
9, 7, 5, 3

Write each number sentence 4 times.
Use each numeral in the set.

6. 11 = ■ + ● For ● use {2, 4, 6, 8} 9, 7, 5, 3

7. 10 = ■ + ● For ■ use {3, 6, 7, 4} 7, 4, 3, 6

8. 13 = ■ + ● For ● use {6, 9, 4, 7} 7, 4, 9, 6

FOLLOW-UP: Arrange reteaching or practice for pupils who show specific needs.
Use page again after reteaching.

(G38–39) AIMS: Check mastery of addition and subtraction facts.
PROCEDURES: Set up a test situation, so each child works independently. Have pupils circle answers where they were uncertain or needed to count. See especially suggestions (G 64) keeping records for each child.

DO YOU KNOW?

Write the answers.

1.

a	b	c
4 + 6 = 10	4 + 2 + 4 = 10	2 + 9 = 11
9 + 3 = 12	4 + 5 + 3 = 12	5 + 6 = 11
8 + 4 = 12	2 + 4 + 6 = 12	8 + 3 = 11
4 + 7 = 11	5 + 3 + 3 = 11	6 + 4 = 10
6 + 6 = 12	4 + 6 + 1 = 11	5 + 7 = 12

Notice children who need to refer to the class number line.
Notice children who count or make tally marks.

2. Write the answers.

12 − 6 = 6	11 − 9 = 2	11 − 5 = 6
10 − 3 = 7	10 − 2 = 8	10 − 7 = 3
12 − 8 = 4	11 − 7 = 4	10 − 5 = 5
11 − 4 = 7	10 − 8 = 2	12 − 3 = 9
12 − 5 = 7	12 − 4 = 8	10 − 4 = 6

Tests may be repeated later or used as practice pages.

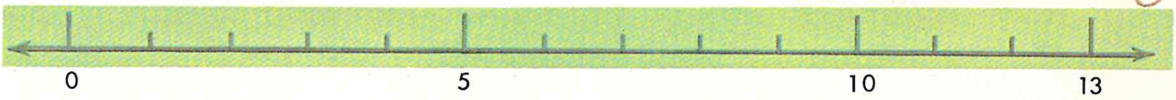
3. Write the missing numerals.

8 + 4 = 12	6 + 2 + 3 = 11	12 − 6 = 6
3 + 8 = 11	3 + 4 + 2 = 9	11 − 2 = 9
4 + 7 = 11	2 + 3 + 7 = 12	12 − 9 = 3
7 + 5 = 12	2 + 5 + 3 = 10	11 − 3 = 8
3 + 7 = 10	2 + 8 + 2 = 12	10 − 4 = 6

FOLLOW-UP: Plan practice or reteaching as needed. Children may make study cards to aid them.

(G39) AIMS: Practice successive subtraction of different numbers; match empty frames with corresponding shapes and supply missing data.
PROCEDURES: The use of this page is optional. The exercise develops the ability to follow instructions. The number facts involved are simple ones and should present no difficulty.

ENRICHMENT



If page is used with a large section of the class, discuss the shapes of the frames and how they match those in Hopper's trips. Help pupils trace his hops on the number line. Children may write the complete sentences or just the answers.

1 2 3 4 5 6

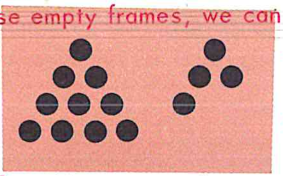
Each shape shows a numeral.
Match the shapes of the frames below
with the shapes above.
Write Hopper's trips with the numerals
in the frames.
Find where Hopper goes on each trip.

Trip 1 10 − 2 − 2 − 2 − 2 = 2
Trip 2 11 − 3 − 3 − 3 = 2
Trip 3 12 − 2 − 4 − 3 = 3
Trip 4 13 − 3 − 2 − 3 − 2 = 3
Trip 5 10 − 2 − 5 − 1 − 1 = 1
Trip 6 12 − 2 − 2 − 6 = 2
Trip 7 13 − 5 − 3 − 2 = 3
Trip 8 11 − 4 − 1 − 2 = 4

FOLLOW-UP: Children may each try to make up a similar trip for Hopper.

(G41–42) AIMS: Explore sets of 14 objects; understand literal numbers as placeholders.
ACTIVITIES: A9, 10; B7, 8 (G106)
PROCEDURES: Help pupils determine how many are in each of the boxes. Demonstrate the procedure for Ex. 1 with sets of 12 on the chalkboard. Explain that just as we use empty frames, we can also use N or any other letter for a placeholder. Explore the pictures. Urge recognition of subsets. Guide the pupils in responding to Ex. 1 orally. The children may follow the oral work by reproducing the subset that is given in each pair, drawing the one that is missing, and writing numerals to replace the frame and N under each pair. Guide children to use markers on the picture at top left to find subsets of 14.

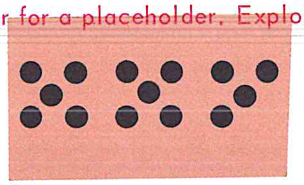
WORKING WITH SETS OF OBJECTS



How many?

14 N = 10 + 4

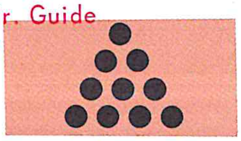
14 N = 5 + 5 + 4



How many?

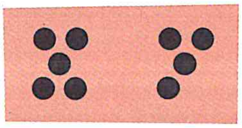
Sometimes N stands for a number.

1. Find N for each pair of pictures.



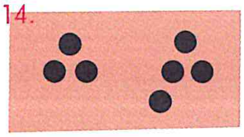
+ N

14 = 10 + N N = 4



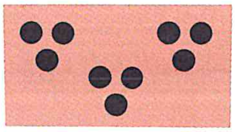
+ N

14 = 9 + N N = 5



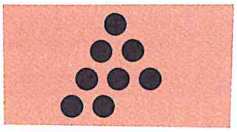
+ N

14 = 7 + N N = 7



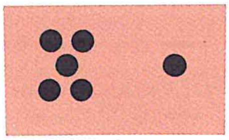
+ N

14 = 9 + N N = 5



+ N

14 = 8 + N N = 6



+ N

14 = 6 + N N = 8

In Ex. 2 pupils are to find the missing number (N) so that each pair of numbers when added will equal 14.

2. Find N.

14 = 4 + N N = 10

14 = N + 9 N = 5

14 = 8 + N N = 6

14 = N + 7 N = 7

3. Find N.

5 + 5 + 4 = N N = 14

1 + 2 + 3 + 4 = N + 4 N = 6

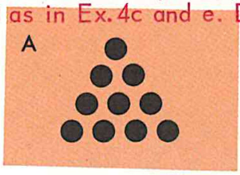
6 + 4 + N = 14 N = 4

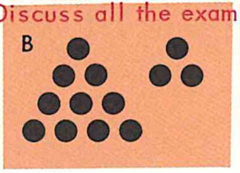
4 + 3 + 2 + N = 10 + 4 N = 5

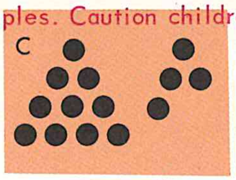
Extend lesson by letting pupils think of combinations: 12 = 3 + N, and so on calling on other children to supply answers.

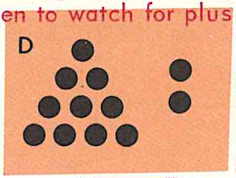
Continue on page 63.

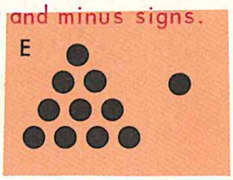
For Ex. 4 follow a similar procedure as in Ex. 1. Precede written work with guided oral work and discussion of all pictures on page. How many dots in each? Discuss again the addition and subtraction of 0 as in Ex. 4c and e. Discuss all the examples. Caution children to watch for plus and minus signs.











N = 10   N = 13   N = 14   N = 12   N = 11

4. Write each number sentence five ways.
Use each number you found for N above.

a. 10 − 1 = 9   11 − 1 = 10   12 − 1 = 11
13 − 1 = 12   14 − 1 = 13

By using ○ = 10, 11, 12, 13, 14, answers in order are:

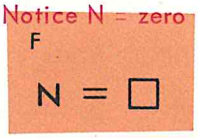
b. ○ − 9 = □   1 – 5
c. ○ + 0 = □   10 – 14
d. ○ + 2 = □   12 – 16
e. ○ − 0 = □   10 – 14
f. ○ − 2 = □   8 – 12
g. ○ + 3 = □   13 – 17

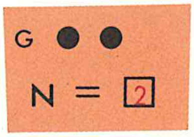
Find the answers.

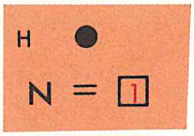
Encourage the children to use their markers with the sets of objects if they need help in finding answers for Ex. 5 and 6.

	a	b	c
5.	6 = 13 − 7	9 = 2 + 7	9 = 14 − 5
	6 = 14 − 8	9 = 12 − 3	9 = 13 − 4
	6 = 12 − 6	9 = 9 − 0	9 = 1 + 8
	6 = 11 − 5	9 = 4 + 5	9 = 7 + 2
	6 = 10 − 4	9 = 6 + 3	9 = 10 − 1
6.	8 = 12 − N 4	11 = N + 9 2	12 = N + 6 6
	8 = 9 − N 1	11 = 10 + N 1	12 = 9 + N 3
	8 = 2 + N 6		12 = 2 + N 10
	8 = 14 − N 6		12 = N + 7 5
	8 = 11 − N 3		12 = 4 + N 8

Notice N = zero



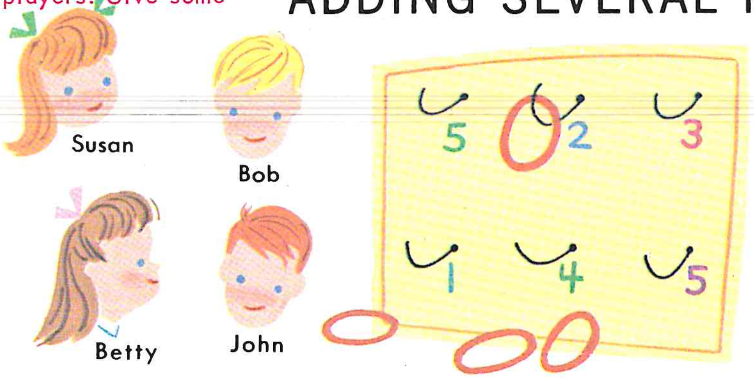




FOLLOW-UP: Repeat any of the Introductory Activities needed. Give extra practice on facts below 14 if needed.

(G42) AIMS: Practice adding several numbers; zeros in adding; practice subtraction.
ACTIVITIES: E4, 5 (G117)
PROCEDURES: Discuss the picture of the Ring Toss game, the value of each peg, the names of the players. Give some introductory problems (G42). Have children match 1a – d with scores on board. Find who had high score.

ADDING SEVERAL NUMBERS



Susan	2	0	3	1	0	5
Bob	4	2	0	0	5	3
Betty	3	5	2	0	2	0
John	1	5	0	3	2	0

1. How do you find a score? Find these scores.

a. 2 + 0 + 3 + 1 + 0 + 5 = 11
b. 4 + 2 + 0 + 0 + 5 + 3 = 14
c. 3 + 5 + 2 + 0 + 2 + 0 = 12
d. 1 + 5 + 0 + 3 + 2 + 0 = 11

In Ex. 2 have each child write at least two correct replacements for the frames, a – d. Allow several pupils to work at the chalkboard. Then have class discuss the replacements.

2. In 3 turns, show 3 ways you can score 12; 14; 11; 13.

a. 12 = □ + △ + ○
b. 14 = □ + △ + ○
c. 11 = □ + △ + ○
d. 13 = □ + △ + ○

Answers vary.

In Ex. 3 pupils are to replace the circles with the numerals 2, 3, or 4. The triangle is for the first answer and the square is for the final answer.

3. Find the answer when ○ = 2, 3, or 4.

a. 12 − 2 = 10 ; 10 − 2 = 8
12 − 3 = 9 ; 9 − 3 = 6
12 − 4 = 8 ; 8 − 4 = 4

Work several similar examples orally. Help pupils with replacements for 3a. Note that numeral in triangle is repeated.

Do **b.** and **c.** the same way.

b. 13 − 2 = 11 ; 11 − 2 = 9 3, 10, 10, 3, 7; 4, 9, 9, 4, 5
c. 11 − 2 = 9 ; 9 − 2 = 7 3, 8, 8, 3, 5; 4, 7, 7, 4, 3

FOLLOW-UP: Use further chalkboard exercises with frames.

(G42–43) AIMS: Relate addition of 2-digit numbers with no renaming to the addition of tens and the addition of ones.

ACTIVITIES: J 1, 2 (G122)

PROCEDURES: Use 100 chart to review adding tens, finding 3 tens and 6 ones, and so on. Help pupils understand that adding 1 ten and 2 ones (12) to 1 ten and 6 ones (16) uses the steps they have already learned in adding tens and ones separately. Work through the model examples with the children substituting different numerals until each child understands the thinking.

ADDING 2- DIGIT NUMBERS

1.

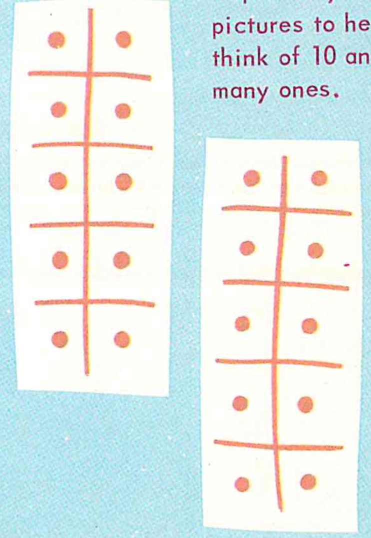
1 ten and 2 ones = 12
+1 ten and 6 ones = 16
2 tens and 8 ones = 28

3 tens and 3 ones = 33
+4 tens and 6 ones = 46
7 tens and 9 ones = 79

5 tens and 7 ones = 57
+2 tens and 2 ones = 22
7 tens and 9 ones = 79

2. How many tens?

10 +10 20	20 +20 40
10 +20 30	20 +30 50
40 +40 80	40 +50 90



Pupils may use pictures to help think of 10 and so many ones.

3. Write the answers.

Most pupils will be able to write answers for Ex. 3 after oral discussion of Ex. 1 and 2.

a.	7 +2 9	77 +22 99	37 +32 69	47 +42 89	67 +12 79
b.	21 +11 32	31 +11 42	51 +11 62	61 +11 72	81 +11 92
c.	24 +30 54	34 +40 74	44 +50 94	54 +40 94	74 +30 104

Last exercise in c should bring automatic response if pupils know the facts well.

FOLLOW-UP: Use any of the activities for addition facts with groups of children who show need for review or reteaching.

(G43–44) AIMS: Find the difference between the numbers represented by two sets of hand pictures; the difference between two numbers.

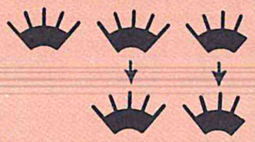
ACTIVITIES: D5, 11; J3 (G114)

PROCEDURES: Let pupils study the hand pictures, determine the number each set represents, match the two sets and determine the difference.

WHAT IS THE DIFFERENCE?

See G43 for additive subtraction algorithm.

1.



= 14 How many in this picture?

= 9 How many in this picture?

Can you match 9 in the first picture with 9 in the second?

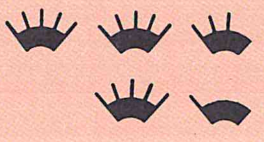
This sentence tells you the **difference:** 14 − 9 = 5

Pupils should easily grasp the idea that the answer is the difference and that it is another way of saying "how many more," "how many less," or "what is left." Ask what numerals go in the frames in each of Ex. 1 – 4. Use several chalkboard examples like:

8 − 3
28 − 3
58 − 3
78 − 3

Pupils may draw hand pictures to help with concept.

2.

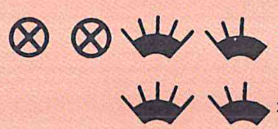


= 13 What is the number?

= 6 What is the number?

What is the difference? 13 − 6 = 7

3.

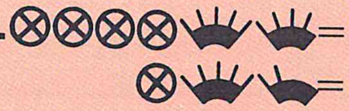


= 28 What is the number?

= 8 What is the number?

What is the difference? 28 − 8 = 20

4.



= 49

= 17

49 − 17 = 32

Try to bring out generalizations with regard to the relation between adding and subtracting ones and adding and subtracting tens and ones. See G43.

5. Draw hand pictures and find the difference.

a. 48 − 2 = 46 57 − 6 = 51 69 − 7 = 62
b. 23 − 1 = 22 45 − 3 = 42 75 − 3 = 72
c. 19 − 8 = 11 27 − 5 = 22 96 − 4 = 92
d. 37 − 4 = 33 77 − 6 = 71 84 − 2 = 82
e. 16 − 5 = 11 33 − 3 = 30 99 − 7 = 92

FOLLOW-UP: Use activities in Sections D and J (G114).

(G44) AIMS: Relate subtraction of 2-digit numbers with no renaming to subtraction of tens and subtraction of ones.

PROCEDURES: Work through Ex. 1 orally showing the steps, subtracting first the tens and then the ones. Then show pupils they can subtract first the ones.

SUBTRACTING 2-DIGIT NUMBERS

Use concrete materials if needed for illustration or pictures at bottom of page.

1.

$$\begin{array}{rcr} 4 \text{ tens and } 3 \text{ ones} & = & 43 \\ -2 \text{ tens and } 2 \text{ ones} & = & \underline{22} \\ \hline 2 \text{ tens and } 1 \text{ one} & = & 21 \end{array}$$

$$\begin{array}{rrrrrr} 60 & 63 & 68 & 70 & 73 & 78 \\ -30 & -32 & -35 & -50 & -52 & -55 \\ \hline 30 & 31 & 33 & 20 & 21 & 23 \end{array}$$

2. Find the answers.

Pupils may write answers only, or copy examples and write answers.

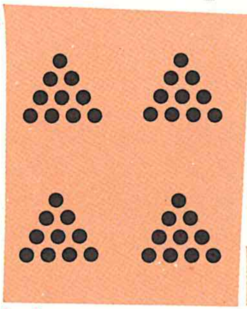
a.
$$\begin{array}{rrrrrrr} 52 & 74 & 25 & 86 & 97 & 34 & 40 \\ -21 & -32 & -12 & -42 & -25 & -11 & -30 \\ \hline 31 & 42 & 13 & 44 & 72 & 23 & 10 \end{array}$$

b.
$$\begin{array}{rrrrrrr} 28 & 57 & 85 & 95 & 73 & 47 & 66 \\ -12 & -13 & -23 & -32 & -31 & -24 & -33 \\ \hline 16 & 44 & 62 & 63 & 42 & 23 & 33 \end{array}$$

c.
$$\begin{array}{rrrrrrr} 22 & 33 & 44 & 55 & 66 & 77 & 88 \\ -11 & -11 & -11 & -11 & -11 & -11 & -11 \\ \hline 11 & 22 & 33 & 44 & 55 & 66 & 77 \end{array}$$

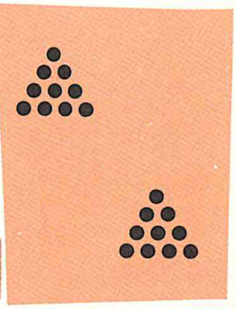
d.
$$\begin{array}{rrrrrrr} 45 & 36 & 64 & 54 & 80 & 24 & 37 \\ -24 & -14 & -42 & -33 & -40 & -13 & -25 \\ \hline 21 & 22 & 22 & 21 & 40 & 11 & 12 \end{array}$$

Ex. 3 is more difficult and you may need to give some help.



3. Can you do these?

$$\begin{array}{rrr} 26 & 36 & 46 \\ -\ 14 & -\ 24 & -\ 34 \\ \hline 12 & 12 & 12 \end{array}$$



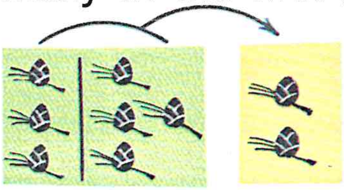
FOLLOW-UP: Any suitable activities from G105.

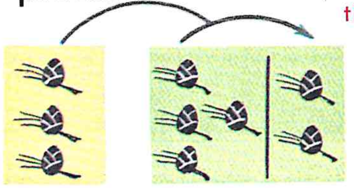
(G44–45) AIMS: Help children realize that the order in which three numbers are added does not change the sum.
ACTIVITIES: G3, 4, 6 (G120)

PROCEDURES: Have pupils discuss the pictures in Ex. 1. Use several chalkboard exercises first (G44–45). Guide pupils to see which two boxes are joined together. Encourage "thinking" the two sets together instead of counting. Explain that only two numbers can be added at one time. As you work through the exercises at the chalkboard, help pupils to put in their own words the associative property of addition, that is, that the grouping of the numerals does not alter the answer. Draw several pictures and let pupils help write the number sentences.

MORE ABOUT ADDING

1. How many in the first green picture?
How many in the first gold picture?





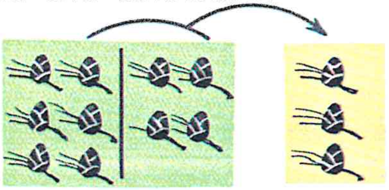
Add the numbers in the frame first.
Add the other number.

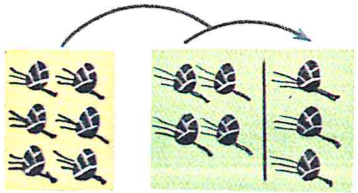
$\boxed{3 + 4} + 2$
$7 + 2 = 9$

$3 + \boxed{4 + 2}$
$3 + 6 = 9$

2. Find the answers.

a.



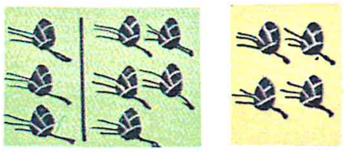


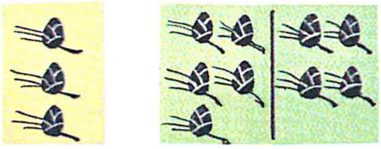
$\boxed{6 + 4} + 3$
$10 + 3 = 13$

$6 + \boxed{4 + 3}$
$6 + 7 = 13$

Question pupils about number of cones in each set. Encourage quick recognition of sets.

b.





$\boxed{3 + 5} + 4$
$8 + 4 = 12$

$3 + \boxed{5 + 4}$
$3 + 9 = 12$

Find the answers.

3. $\boxed{2 + 6} + 3 = 11$ $2 + \boxed{6 + 3} = 11$

4. $\boxed{4 + 1} + 5 = 10$ $4 + \boxed{1 + 5} = 10$

Pupils may use picture line on next page if they need help.

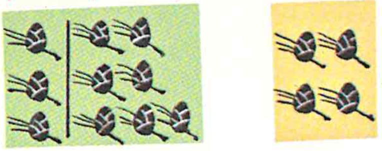
Continue on page 69.

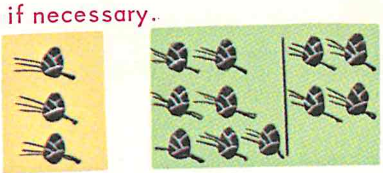
The picture line may be used for checking as pupils locate 8 + 3 and 2 + 9 and find that both answers are 11.

These exercises may be explained with chalkboard examples if necessary.

5.

Have pupils discuss the pictured sets for each example. "Which two are joined? Which set is separate? Are the pictured sets alike?"





$\boxed{3 + 7} + 4$ $\qquad$ $3 + \boxed{7 + 4}$

$10 + 4 = 14$ $\qquad$ $3 + 11 = 14$

6. $\boxed{5 + 2} + 7 = 14$ $\qquad$ $5 + \boxed{2 + 7} = 14$

7. $3 + \boxed{6 + 3} = 12$ $\qquad$ $\boxed{3 + 6} + 3 = 12$

8. $\boxed{2 + 2} + 9 = 13$ $\qquad$ $2 + \boxed{2 + 9} = 13$

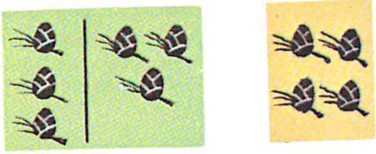
9. $4 + \boxed{2 + 7} = 13$ $\qquad$ $\boxed{4 + 2} + 7 = 13$

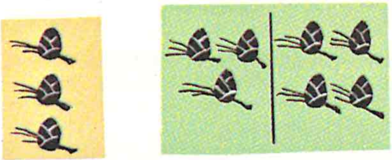
After children have completed the exercises, have them show on the picture line that the answers are correct.

10. Write the number sentences.

Pupils may also draw dot pictures to show other examples. Pictures will give you a check on their understanding.

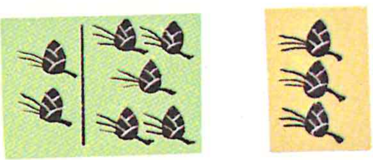
a.

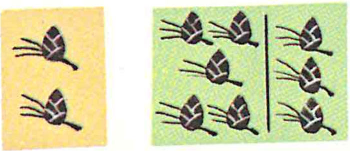




$\boxed{3 + 3} + 4 = 10$ $\qquad$ $3 + \boxed{3 + 4} = 10$

b.





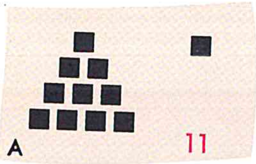
$\boxed{2 + 5} + 3 = 10$ $\qquad$ $2 + \boxed{5 + 3} = 10$

FOLLOW-UP: Select activities as needed from Section G (G120) as needed.

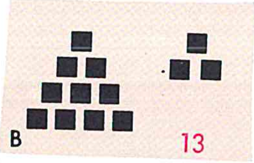
(G45) AIMS: Develop addition facts with sums of 11 – 14.
ACTIVITIES: Any suitable activities in Section B (G107)
PROCEDURES: Help pupils rediscover the possible subsets for 11 – 14 by using markers with the pictures. "How many objects are in each set?" In picture A show 7 + 4, 9 + 2. Cover 5, how many left?" and so on.

PRACTICING WITH NUMBER FACTS

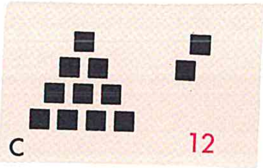
1. Write the numeral for each picture.



11



13



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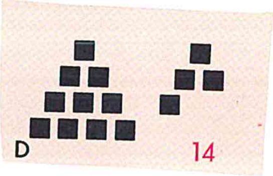


14

2. IF THEN

a. 4 + 7 = 11; 11 – 4 = N 7
b. 6 + 6 = 12; 12 – 6 = N 6
c. 3 + 9 = 12; 12 – 3 = N 9
d. 5 + 8 = 13; 13 – 5 = N 8
e. 7 + 6 = 13; 13 – 7 = N 6

Bring out the inverse relationships in Ex. 2.

Review meaning of more and less.

3. How many more is:

14 than 11? 3
13 than 10? 3
11 than 9? 2
12 than 10? 2

Encourage pupils to use their markers and the pictures to find the answers. "Find a picture of 14. Use your marker to show 11 of the 14. How many are left?"

4. How many less is:

8 than 14? 6
6 than 12? 6
5 than 11? 6
7 than 13? 6

5. Find the number you need.

Using pictures or a number line, work through one or two examples orally. Help pupils think in terms of a number sentence. 6 + ☐ = 13

You have:	You need:	You want:
4	7	11
6	7	13
5	7	12
10	4	14
8	6	14

FOLLOW-UP: If some pupils need more practice in thinking through examples, supply different numbers for examples on page.

(G45–46) AIMS: Recognize common coins; determine equal values; count by 1's, 5's, and 10's.
ACTIVITIES: Count real or toy money, learning value of coins.
PROCEDURES: Discuss the denominations of the pictured coins. "What coins show in the wishing well? How can you count them?" 10, 20, 25, 30, 31, 32¢

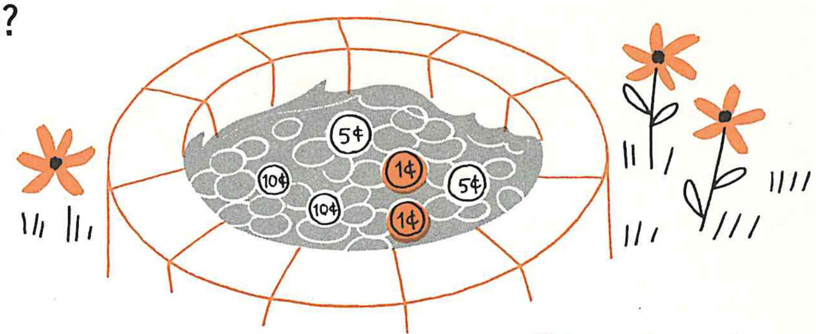
COUNTING WITH MONEY

"How many pennies are worth a nickel?" Discuss pictures on the chart. "How many nickels are in 14¢? How many pennies will you need?"

1. How many nickels and how many pennies?

14¢	△ 2	☐ 4
7¢	△ 1	☐ 2
5¢	△ 1	☐ 0
13¢	△ 2	☐ 3
10¢	△ 2	☐ 0

Wishing Well



2. Write the answers. This may be used orally.
How many nickels and how many pennies?

a. 6¢ 1, 1 4¢ 0, 4 11¢ 2, 1 12¢ 2, 2
b. 8¢ 1, 3 10¢ 2, 0 13¢ 2, 3 9¢ 1, 4
c. 5¢ 1, 0 7¢ 1, 2 10¢ 2, 0 14¢ 2, 4

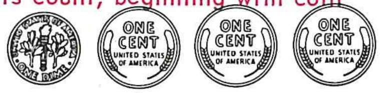
Assist with recognition of pictured coins in Ex. 4.

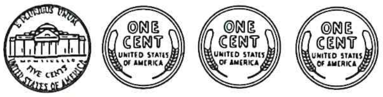
3. How many dimes and how many pennies?
10¢ = 1 dime 10¢ = 10 pennies
11¢; 14¢; 10¢; 13¢; 12¢; 15¢; 18¢
1, 1 1, 4 1, 0 1, 3 1, 2 1, 5 1, 8

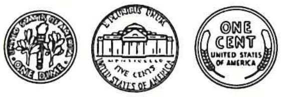
Children may make a chart like that in Ex. 1 and write D for dime and P for penny.

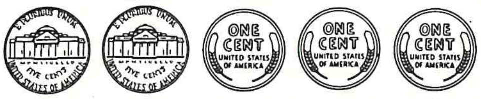
4. How much money?

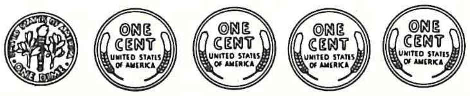
Help pupils count, beginning with coin of greatest value. 10, 11, 12, 13¢, and so on.

a.  13¢

b.  8¢

c.  16¢

d.  13¢

e.  14¢

5. Write the missing numerals for each line.

Review writing numerals in sequence.

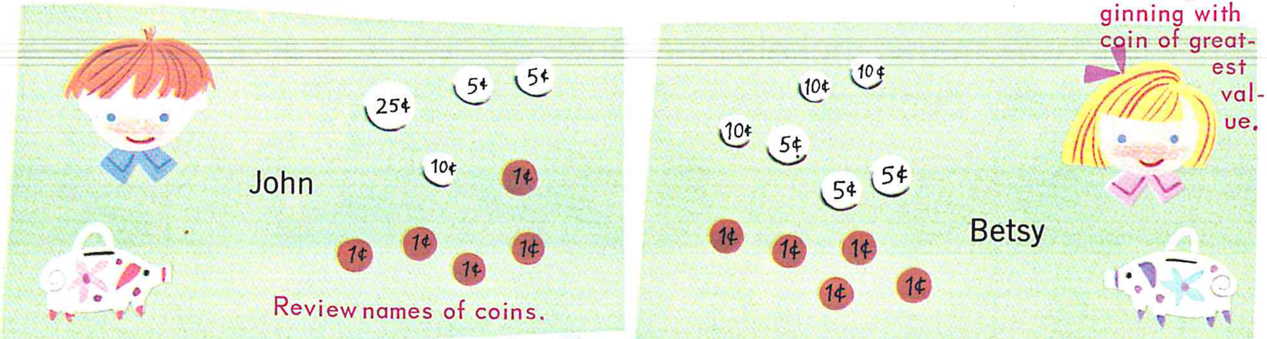
a. 5, 10, 15, 20, 25, 30
b. 30, 40, 50, 60, 70, 80
c. 1, 2, 3, 4, 5, 6
d. 7, 8, 9, 10, 11, 12
e. 50, 60, 70, 80, 90, 100
f. 28, 29, 30, 31, 32, 33

FOLLOW-UP: Continue to use informal opportunities to count money and to recognize equal values.

(G46–47) AIMS: Learn to solve problems and create problems to fit number sentences; practice on addition and subtraction. ACTIVITIES: F 9, 10, 12a (G119)
PROCEDURES: Use the suggested problems in G46–47 to help the pupils make stories for each number sentence.

NUMBER STORIES ABOUT MONEY

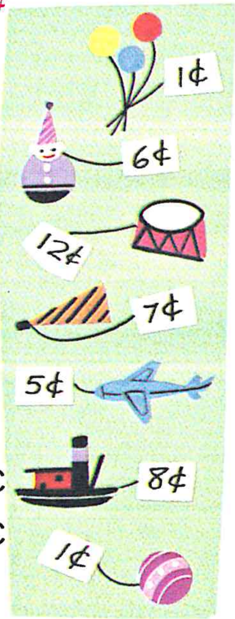
Review counting beginning with coin of greatest value.



Review names of coins.

Ex. 1 and 2 should be oral work.

1. How much has John? 50¢ How much has Betsy? 50¢
2. Tell a story about how much Betsy puts in her bank. Think of different coins to equal the amounts of money.



The children went to a toy store.
Make a story for each number sentence.
Write the missing numerals.

Discuss pictures and prices. Ex. 3. Have children find items they could buy in each example. See also suggestions on G46–47.

3. a.
6¢ + 6 ¢ = 12¢
6 ¢ + 8¢ = 14¢
13¢ − 5 ¢ = 8¢
5¢ + 9¢ = 14 ¢

b.
11¢ − 7¢ = 4 ¢
12 ¢ − 3¢ = 9¢
4¢ + 8 ¢ = 12¢
6 ¢ + 7¢ = 13¢

4. Write the answers.

a.

10	8	4	3	8	5	6	9
+ 4	+6	+7	+9	+5	+6	+7	+2
14	14	11	12	13	11	13	11

b.

5	10	3	4	6	2	9	7
+9	+ 3	+8	+6	+6	+8	+5	+7
14	13	11	10	12	10	14	14

FOLLOW-UP: Repeat some of the Introductory Activities using real coins or toy money.

(G47–48) AIMS: Practice counting money; practice addition and subtraction.
ACTIVITIES: D3, 19 (G114)
PROCEDURES: Help pupils read the chart as they respond to questions. See G 47. Discuss the chart and the money for each day. Help children in counting money to think in terms of 10 and so many more (G47).

WAYS TO THINK ABOUT MONEY

Money for the Red Cross

	Pennies	Nickels	Dimes
Monday	5	2	3
Tuesday	10	4	2
Wednesday	14	3	6
Thursday	22	5	2
Friday	17	1	5

Review names of days in the week.

1. On Monday there were how many dimes? pennies? nickels? Are 2 nickels as much money as 3 dimes? Count all the money for Monday.
3 dimes + 2 nickels + 5 pennies = 45 ¢

2. **a.** 5 pennies + 10 pennies = 15 pennies
b. 14 pennies + 5 pennies = 19 pennies
c. 2 nickels + 4 nickels + 3 nickels = 9 nickels
d. 3 dimes + 2 dimes + 6 dimes = 11 dimes

Relate adding of money to basic addition facts.

3. Find the answers.

Some children may find answers more easily if they review adding tens. It may be helpful to give some practice in simple subtraction examples involving money before pupils begin Ex. 4.

60¢ + 15¢ = 60¢ + 10¢ + 5¢ = 75¢
a. 40¢ + 50¢ = 90 ¢ 50¢ + 2¢ + 6¢ = 58 ¢
b. 50¢ + 20¢ = 70 ¢ 10¢ + 25¢ + 5¢ = 40 ¢

4.
a. 90¢ − 60¢ = 30 ¢ 80¢ − 50¢ = 30 ¢
b.

89¢	67¢	78¢	56¢	80¢	70¢
− 7¢	− 5¢	− 7¢	− 5¢	−40¢	−40¢
82 ¢	62 ¢	71 ¢	51 ¢	40 ¢	30 ¢

FOLLOW-UP: Challenge able children to find the total amounts represented in dimes, in nickels, in pennies, the total amount in all denominations on the chart.

(G48–49) AIMS: Recognize coins, determine amounts of money and decide what coins could be used to make up given amounts of money, solve problems involving making change. ACTIVITIES: Compare coins.

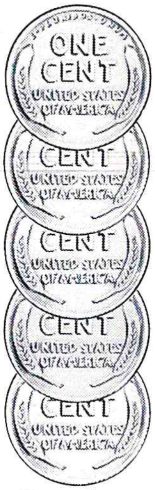
WHAT DOES IT COST?

Half dollar

Quarter

Nickels

Dimes

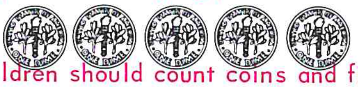

Pennies

PROCEDURES: Have pupils read words naming coins and indicate what coins represent the most money and the least money. Find the pictures of each coin.

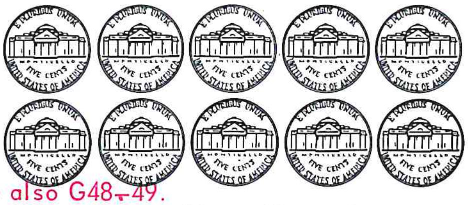
1. Which coin will buy the least? the most?
A half dollar is worth how many quarters?

2. How much money?

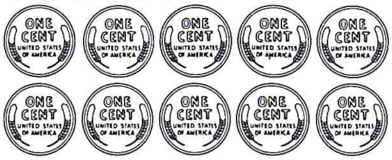
Help with identifying pictures of coins.

A  = 50

Children should count coins and find values.

B  = 50

See also G48–49.

C  = 10

3. How much money?

	Dimes	Nickels	Pennies	
a.	1	0	3	13¢
b.	1	1	1	16¢
c.	0	3	0	15¢
d.	0	1	5	10¢
e.	0	0	5	5¢
f.	2	0	8	28¢
g.	3	1	2	37¢

4. How many ways can you show 21¢?

21¢ = 2 dimes 1 pennies
21¢ = 2 nickels 1 dimes 1 pennies
21¢ = 4 nickels 1 pennies

Use several examples in each exercise orally before allowing children to write the answers.

21 pennies, and so on.

Show the coins you can use for each of these.

a. 30¢ 35¢ 17¢
b. 26¢ 40¢ 11¢
c. 42¢ 23¢ 32¢
d. 18¢ 29¢ 47¢

Answers will vary.

Continue on page 75.

In Ex. 5 use the problem situations as oral exercises, first asking what each child bought, and having children count the change. Then children may draw pictures of the coins or write the names of the coins. Help pupils find items and price.

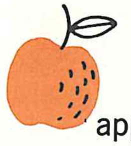
Circled figures represent amount the child had to begin with.

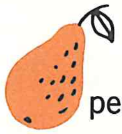
5. Billy had 25¢. He paid the storekeeper $\boxed{4¢}$.
The storekeeper counted:
$\boxed{4¢}$ 5¢, 15¢, 25¢. What did Billy buy?
What coins did he get back?

Tell a story about what each child bought.

Sue $\boxed{6¢}$ 7¢, 8¢, 9¢, 10¢, 20¢, 25¢
Tom $\boxed{8¢}$ 9¢, 10¢
Bob $\boxed{15¢}$ 20¢, 25¢
Ann $\boxed{7¢}$ 8¢, 9¢, 10¢
Tim $\boxed{8¢}$ 9¢, 10¢, 15¢, 20¢, 25¢
Mary $\boxed{6¢}$ 7¢, 8¢, 9¢, 10¢
Ruth $\boxed{10¢}$ 20¢, 25¢

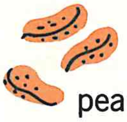
Count the change for each purchase.


apple
6¢


pear
8¢

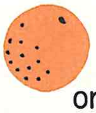
banana
4¢

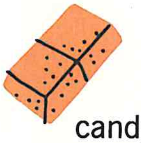
Encourage pupils to use the pictures at the right to assist them with the reading vocabulary needed in Ex. 6. Answers may be written after the procedure is understood, or page may be entirely oral work. Use toy money for the purchases if children are still not sure of coins.


peanuts
15¢

6. How much money?

a. 2 apples cost 12¢. 3 bananas cost 12¢.
b. 2 bananas cost 8¢. 2 candy bars cost 20¢.
c. 2 oranges cost 14¢. 3 candy bars cost 30¢.
d. An apple and a pear cost 14¢.
e. An apple and a banana cost 10¢.
f. A banana and a pear cost 12¢.
g. Peanuts and a banana cost 19¢.

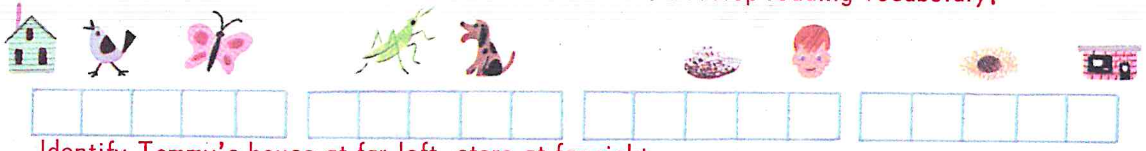

orange
7¢


candy bar
10¢

FOLLOW-UP: Use the oral problem-solving situations suggested in G48–49.

(G49–50) AIMS: Add and subtract several numbers in sequence; solve problems.
ACTIVITIES: G2, 4, 5, 6 (G120)
PROCEDURES: Discuss the picture line and use Ex. 1 to tell at which block Tommy saw each thing. In Ex. 2 pupils will determine how many blocks there are from one object to another. Record the number sentences on the chalkboard for review. Develop reading vocabulary.

USING NUMBER FACTS



Identify Tommy's house at far left, store at far right.

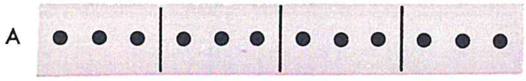
1. Tommy walks how many blocks to the store? 20
   Where did he see the butterfly? 4 the dog? 9

2. How far is it from the bird to the dog? 9 − 2 = 7
   How far is it from the rock to the hole? 18 − 13 = 5
   from the grasshopper to Billy?
   Write the number sentences to show how far.

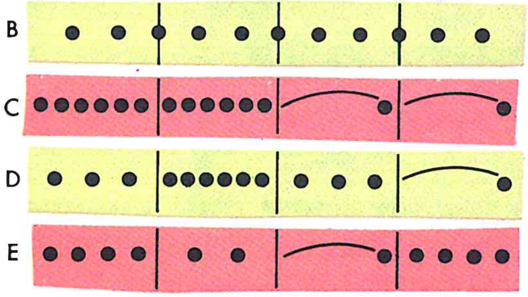
Children will need help on this one. They may think 7 + 3 = 10, 10 + 5 = 15.

See also G49 for more about game.

3. Tommy often plays a game.
   How many steps in each block in A? Add his score. $3 + \boxed{3} + \boxed{3} + \boxed{3} = \boxed{12}$
   How many steps and how many jumps in B? C? D? E?



Dots represent steps. Curves are jumps.



4. Find these scores.
   a. $1 + 1 + 1 + 1 = \boxed{4}$
   b. $4 + 2 + 1 + 4 = \boxed{11}$
   c. $2 - 1 + 2 - 1 + 2 - 1 + 2 = \boxed{5}$
   d. $6 + 6 + 1 + 1 = \boxed{14}$
   e. $3 + 6 + 3 + 1 = \boxed{13}$
   f. $3 - 2 + 3 - 2 + 3 - 2 = \boxed{3}$
   g. $4 - 2 + 4 - 2 + 4 - 2 = \boxed{6}$
   h. $6 - 2 + 6 - 2 + 3 - 2 = \boxed{9}$

After pupils discuss the game described in Ex. 3 and find answers to the questions, have them look at the examples in Ex. 4 and use them for a written exercise.

FOLLOW-UP: See if children can figure out some jumps and write the number sentences.
Use Activities G6, 8 (G120)

(G50) AIMS: Develop meaning of the symbol '≠' (not equal); practice.
ACTIVITIES: B16 (G111)
PROCEDURES: See G50. Talk over with class the two signs in white box. Use many chalkboard examples of equations that are equal and not equal. Have pupils tell why in each example.

NUMBER SENTENCES

= is equal to
≠ is not equal to

1. $6 + 7 \neq 8 + 4$ We read this number sentence: $6 + 7$ is not equal to $8 + 4$.
We could show it this way:

$$\underbrace{6 + 7}_{\boxed{13}} \neq \underbrace{8 + 4}_{\boxed{12}}$$

See suggestions G50. Ask what changes in the equations would make them equal. For example, 2a; add 2 on the left or subtract 2 from right.

2. Do $4 + 5$ and $6 + 5$ name the same number? Show that the two sides are not equal.

a. $\underbrace{4 + 5}_{\boxed{9}} \neq \underbrace{6 + 5}_{\boxed{11}}$ $\qquad \underbrace{13 - 4}_{\boxed{9}} \neq \underbrace{14 - 4}_{\boxed{10}}$

Bead line may be used to show answers.

b. $\underbrace{5 + 9}_{\boxed{14}} \neq \underbrace{10 + 5}_{\boxed{15}}$ $\qquad \underbrace{11 - 2}_{\boxed{9}} \neq \underbrace{12 - 4}_{\boxed{8}}$

Stress idea that sentences in Ex. 2 are true because sign says they are not equal. Illustrate on chalkboard.

3. Compare the sentences. Write the missing numerals.

a. $7 + 4 \neq 3 + 9 \longrightarrow \left[\begin{array}{l} \boxed{8} + 4 = 3 + 9 \\ 7 + 4 = \boxed{2} + 9 \end{array}\right.$

7 + 3 ≠ 6 + 3
true
7 + 3 = 6 + 3
not true

b. $14 - 7 \neq 13 - 8 \longrightarrow \left[\begin{array}{l} \boxed{12} - 7 = 13 - 8 \\ 14 - 7 = 13 - \boxed{6} \end{array}\right.$

7 - 1 = 2 + 4
true
7 - 1 ≠ 4 + 4
true

4. Make each sentence show two names for the same number.

Help pupils find answer for facts on each side to determine how to change sentences. Answers will vary.

a. $6 + 8 \neq 6 + 6$ $\qquad 4 + 6 \neq 5 + 7$
b. $9 + 3 \neq 3 + 6$ $\qquad 11 + 2 \neq 9 + 4$
c. $12 - 7 \neq 10 - 6$ $\qquad 10 - 3 \neq 8 - 6$

FOLLOW-UP: B14 (G111)

(G50–51) AIMS: Help children read number of pounds on a scale; add and subtract numbers in situations involving pounds.
ACTIVITIES: Have children weigh various things and record weights. Weigh the children.
PROCEDURES: Develop meaning of pound and how it is used. Study the pictures to see which picture story or stories help them complete the number sentences. They are to find the missing numeral for each number sentence.

WEIGHT IN POUNDS

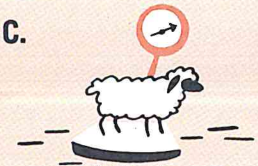
A.

Jean weighs
62 pounds

B.

Jean and her cat
weigh 68 pounds

C.



Little lamb
weighs 20 pounds

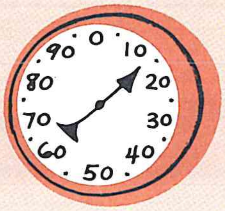
D.

Billy weighs
70 pounds

E.

Billy and his dog
weigh 85 pounds

The numerals on the scale stand for pounds. Show 15 pounds.



Develop weigh, scale.

Discuss marks on scale. "About where would 62 be? 70? 35?"

1. Look at the pictures. Tell a story for each number sentence.

62 pounds + 6 pounds = 68 pounds
20 pounds + 70 pounds = 90 pounds
70 pounds + 15 pounds = 85 pounds
90 pounds = 20 pounds + 70 pounds
68 pounds = 62 pounds + 6 pounds
85 pounds = 70 pounds + 15 pounds

Invite pupils to describe a number situation or story for each of the different types of examples in Ex. 2. Try to relate the examples to the pictures.

2. Find the answers.

a. 68 pounds − 8 pounds = 60 pounds; 85 pounds − 15 pounds = 70 pounds

$$\begin{array}{r} 68 \text{ pounds} \\ -\ 8 \text{ pounds} \\ \hline 60 \text{ pounds} \end{array} \qquad \begin{array}{r} 85 \text{ pounds} \\ -\ 15 \text{ pounds} \\ \hline 70 \text{ pounds} \end{array}$$

b.

$$\begin{array}{r} 88 \text{ pounds} \\ -\ 6 \text{ pounds} \\ \hline 82 \text{ pounds} \end{array} \qquad \begin{array}{r} 30 \text{ pounds} \\ +52 \text{ pounds} \\ \hline 82 \text{ pounds} \end{array}$$

c.

$$\begin{array}{r} 62 \text{ pounds} \\ +\ 6 \text{ pounds} \\ \hline 68 \text{ pounds} \end{array} \qquad \begin{array}{r} 20 \text{ pounds} \\ +70 \text{ pounds} \\ \hline 90 \text{ pounds} \end{array}$$

FOLLOW-UP: Continue Introductory Activities as needed.

(G79) AIMS: Review addition and subtraction; equal to or not equal to.
PROCEDURES: You may wish to work through one example for each exercise orally, but written responses will give you valuable information as to where further work is needed.

DO YOU REMEMBER?

1. Find the difference.

12	10	14	13	14	11	10
− 7	− 5	− 6	− 4	− 7	− 3	− 7
5	5	8	9	7	8	3

2. Find the answers.

20 pounds	60 pounds	31 pounds
+15 pounds	+20 pounds	+21 pounds
35 pounds	80 pounds	52 pounds

3. How much money?

a. 4¢ + 7¢ = 11 ¢ 3¢ + 7¢ = 10 ¢

b. 7¢ + 6¢ = 13 ¢ 9¢ + 5¢ = 14 ¢

4. Write the answers.

a.

5 tens	9 tens	10 tens
−2 tens	−3 tens	− 4 tens
3 tens	6 tens	6 tens

b.

56	84	70	86	33	67	45
+13	−21	−40	−32	+11	−17	−15
69	63	30	54	44	50	30

5. Write = or ≠ for the frames to make the sentences true.

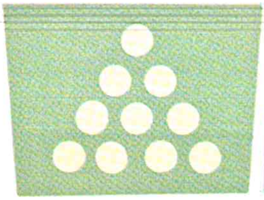
a. 4 + 9 = 5 + 8 5 + 6 ≠ 9 − 3

b. 14 = 8 + 6 14 ≠ 6 + 6

FOLLOW-UP: Use activities from Sections B and E (G107) as need is indicated. Plan review for pupils who show weaknesses in any areas.

(G51–52) AIMS: Test children's understanding of the concepts developed in this chapter.
PROCEDURES: Set up a test situation in which pupils find answers without concrete aids. Be sure they understand directions before they begin to write.

DO YOU KNOW?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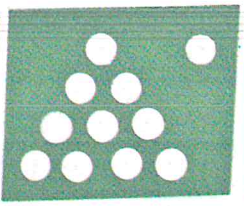
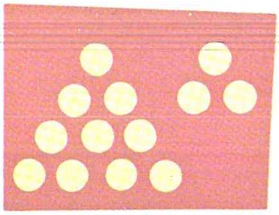
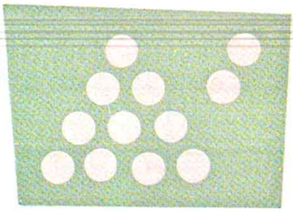
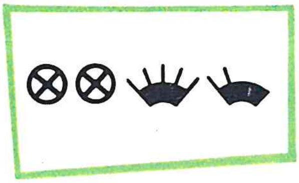
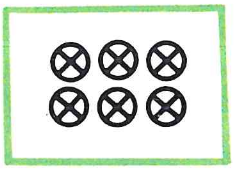

N = 11

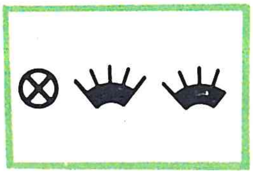

N = 13

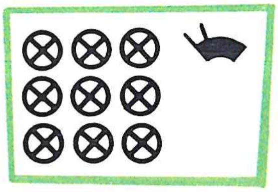

N = 12

1. How many in each set above?
Find N for the pictures below.


N = 27


N = 60


N = 19

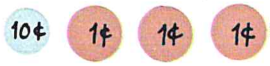

N = 92

2. Write the missing numerals.

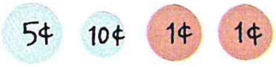
a. 35 + 2 + 2 = 39
b. 22 + 6 = 28
c. 51 + 3 + 4 = 58

49 − 5 = 44
87 − 5 = 82
78 − 6 = 72

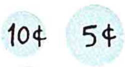
3. How much money?



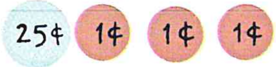
= 13 ¢



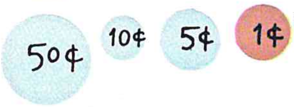
= 17 ¢



= 15 ¢



= 28 ¢



= 66 ¢

4. Find the answers.

15¢ − 10¢ = 5 ¢
14¢ − 5¢ = 9 ¢
8¢ + 7¢ = 15 ¢
6¢ + 7¢ = 13 ¢
48¢ − 5¢ = 43 ¢

Continue on page 81.

You may wish to give the test in two sections. Plan activities to assist those children whose understanding appears inadequate.

Write the missing numerals.

5.

a

$4 + \boxed{5} = 9$
$3 + \boxed{7} = 10$
$2 + \boxed{6} = 8$
$4 + \boxed{6} = 10$
$3 + \boxed{6} = 9$

b

$7 + 4 = \boxed{11}$
$4 + 9 = \boxed{13}$
$5 + 7 = \boxed{12}$
$4 + 8 = \boxed{12}$
$6 + 5 = \boxed{11}$

c

$8 + 5 = \boxed{13}$
$3 + 9 = \boxed{12}$
$6 + 7 = \boxed{13}$
$3 + 7 = \boxed{10}$
$4 + 5 = \boxed{9}$

6.

a

$10 - 7 = \boxed{3}$
$11 - 3 = \boxed{8}$
$8 - 6 = \boxed{2}$
$13 - 7 = \boxed{6}$
$12 - 4 = \boxed{8}$

b

$13 - \boxed{4} = 9$
$12 - \boxed{4} = 8$
$13 - \boxed{6} = 7$
$12 - \boxed{5} = 7$
$14 - \boxed{5} = 9$

c

$13 - 5 = \boxed{8}$
$12 - 3 = \boxed{9}$
$13 - 8 = \boxed{5}$
$12 - 9 = \boxed{3}$
$11 - 6 = \boxed{5}$

7.

a

$9 - 3 = 10 - \boxed{4}$
$12 - 8 = 11 - \boxed{7}$
$11 - 6 = 12 - \boxed{7}$
$13 - 4 = 12 - \boxed{3}$

b

$9 + 4 = 8 + \boxed{5}$
$5 + 8 = 4 + \boxed{9}$
$4 + 7 = 5 + \boxed{6}$
$2 + 9 = 3 + \boxed{8}$

8.

4	7	5	3	5	10
3	7	2	4	5	0
6	0	4	4	4	3
$\boxed{13}$	$\boxed{14}$	$\boxed{11}$	$\boxed{11}$	$\boxed{14}$	$\boxed{13}$
13	14	11	11	14	13

FOLLOW-UP: Give necessary reteaching or practice, then repeat the test for those children.

(G52) AIMS: Practice addition and subtraction.
ACTIVITIES: Adapt any of the games or exercises (G117) to include the facts to 14.
PROCEDURES: Explain to pupils that N stands for a number which they are to find. Discuss the word joker and bring out its use here. Explain that all the answers are the same except one which is the joker. They must find the joker and tell why it is the joker.

ENRICHMENT

1. Find N. Find the **joker.**

N = 2 + 8; N = 3 + 8; N = 4 + 7; N = 5 + 6

$\boxed{10}$ $\boxed{11}$ $\boxed{11}$ $\boxed{11}$

Is N the same for each of these sentences?

Which sentence is different? 2 + 8 is the joker.

In all the other sentences N = 11.

2. Find N. Find the joker.

N = 7 + 6; N = 8 + 5; N = 9 + 4; N = 10 + 5

10 + 5 is the joker.

N = 11 − 4; N = 12 − 6; N = 13 − 6; N = 14 − 7

12 − 6 is the joker.

N = 14 − 5; N = 13 − 4; N = 12 − 3; N = 11 − 3

11 − 3 is the joker.

N = 9 + 3; N = 8 + 4; N = 7 + 6; N = 6 + 6

7 + 6 is the joker.

3. Find N. Challenge the more able children to find short cuts in Ex. 3. Operations are to be performed in the order given.

6 N = 10 − 7 + 3 10 N = 8 − 4 + 6 9 N = 3 + 9 − 3
10 N = 7 − 2 + 5 4 N = 6 + 2 − 4 13 N = 14 − 4 + 3
13 N = 3 + 8 + 2 14 N = 10 − 2 + 6 10 N = 13 − 6 + 3

FOLLOW-UP: Select several numbers. Have pupils find as many names as they can for these numbers using facts on the text page.

(G54) AIMS: Explore sets containing 15 objects; practice addition and subtraction facts for the numbers 11 – 15. ACTIVITIES: A 14a, b, c (G107)

PROCEDURES: Have pupils study each of the sets to find how many objects are in the set and how many ways they can see and record the subsets. (3 fives, 5 + 5 + 5; 10 + 5 and so on.)

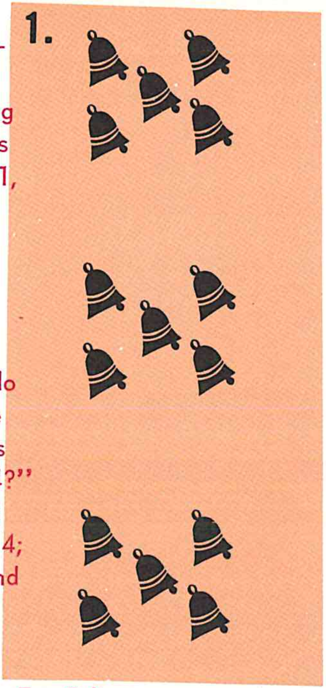
LEARNING ABOUT FIFTEEN

How many objects in each picture?

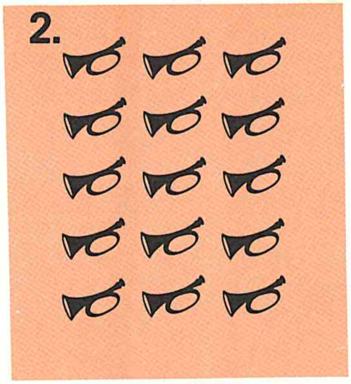
Encourage counting by fives in Ex. 1, 2, 3.

"How do you see the sets in Ex. 4?" (10 + 4; 6 + 4 + 4; 7 + 7 and so on.)

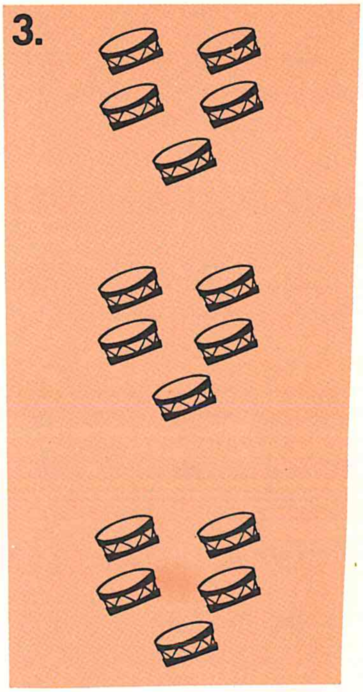
1.



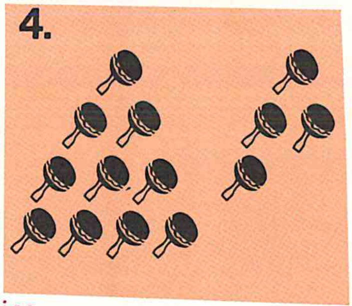
2.



3.



4.



Develop Ex. 5 first as an oral exercise.

5. Use your marker to show these subsets.

Lead pupils to state that the order of adding does not change the sum. (Commutative property).

Picture 1

a. 5 and 10

b. 8 and 7

c. 12 and 3

d. 6 and 9

Picture 2

3 and 12

8 and 7

10 and 5

6 and 9

Picture 3

a. 4 and 11

b. 8 and 7

c. 10 and 5

Picture 4

10 and 4

9 and 5

6 and 8

Review facts with sums or minuends of 12, 13, 14 (G107).

Continue on page 84.

Use Ex. 6 and 7 for practice and review. Children may refer to the pictures on page 83 if they need help. Ex. 8 provides an opportunity to practice with 2-digit numbers. Call attention to the signs.

6. Find the answers.

Children may copy exercises the day before, or they may write only the answers.

a.	4	7	14	9	6	9
	+8	+7	+ 1	+6	+7	+4
	12	14	15	15	13	13
b.	7	10	5	6	7	13
	+8	+ 5	+9	+8	+5	+ 2
	15	15	14	14	12	15
c.	5	12	4	6	11	7
	+8	+ 3	+9	+6	+ 4	+4
	13	15	13	12	15	11

As an oral exercise, let pupils see how many inverse pairs they can find in Ex. 6 and 7. (6 + 7 = 13, 13 – 7 = 6; 9 + 6 = 15, 15 – 6 = 9, and so on.)

7. Do what the sign tells you.

a.	12	13	15	13	15	13
	– 3	– 6	– 3	– 9	– 6	– 2
	9	7	12	4	9	11
b.	13	14	15	13	15	13
	– 3	– 7	– 4	– 8	– 9	– 7
	10	7	11	5	6	6
c.	12	15	14	13	14	12
	– 6	– 7	– 5	– 4	– 8	– 7
	6	8	9	9	6	5

Review adding by endings; adding and subtracting tens.

8. Watch the signs.

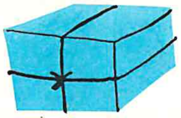
83	62	36	72	40	91
+12	–30	–23	+25	+50	+11
95	32	13	97	90	102

FOLLOW-UP: A14 a, b, c (G107).

(G54–55) AIMS: Solve problems involving multiplication and division facts, and the comparison idea in subtraction and addition.
ACTIVITIES: Use toy money to buy stamps and make change.
PROCEDURES: Read the story about buying stamps (G54–55). Have pupils use their counters to solve the number stories.

COMPARING THE COST

1. Sue's box



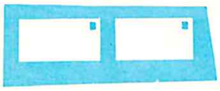
15¢

Ann's box

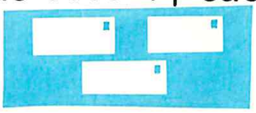
8¢

Which cost more to mail?
How much more?
15¢ − 8¢ = 7 ¢

2. Post cards cost 4¢ each. How much did Sue spend? 8¢
How much did Ann spend? 12¢



Sue's

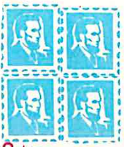


Ann's

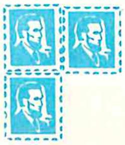
Who spent less? Sue How much less? 4¢

Encourage pupils to tell how they got their answers.

3. Sue bought four 3¢ stamps.
Ann bought three 3¢ stamps.
Who spent more? Sue How much more? 3¢

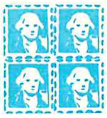


Sue's

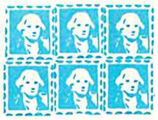


Ann's

4. These stamps are 2¢ each.
Ann spent 12 ¢.
Sue spent 8 ¢.
Write a number sentence to show who spent less. 12¢ − 8¢ = 4¢



Sue's



Ann's

Have Ex. 5 and 6 read by pupils and the answers written.

5. It costs 5¢ to mail a letter.
Ann has 3 letters to mail. What will the stamps cost? 15¢

6. Find the answers.

3 threes = 9
5 threes = 15
4 threes = 12
5 twos = 10
4 twos = 8
6 twos = 12

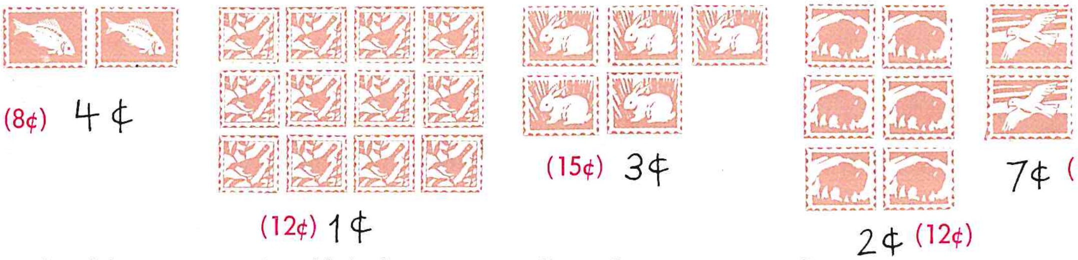
FOLLOW-UP: Let the class make up oral problems. Have them use toy money to buy and sell stamps.

(G55) AIMS: Use pictures to formulate problem-solving situations; solve problems; practice multiplication and division facts. ACTIVITIES: A16 (G107)

PROCEDURES: Discuss the number of stamps each girl bought and the use of the picture line to determine the total amount of money needed. Use picture line below to review necessary number facts.

FIND HOW MUCH

Ann bought these stamps.



1. How much did Ann pay for 4¢ stamps? for 1¢ stamps? for 3¢ stamps? for 7¢ stamps? See above.

2. How much did Sue pay for each kind of stamps? See below.

See if pupils can suggest combinations of stamps. Ann could buy for 12¢; 25¢. (two 3¢ + three 2¢, and so on.)

3. **a.** Twelve is how many more than 9? 3

b. Six is how many more than 4? 2

c. Three is how many less than 4? 1

d. Nine is how many less than 12? 3

e. Three 4¢ stamps cost 12 ¢.

f. Two 5¢ stamps cost 10 ¢.

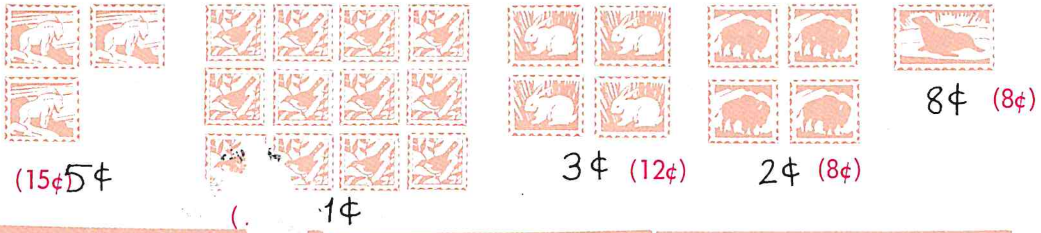
g. Nine 1¢ stamps cost 9 ¢.

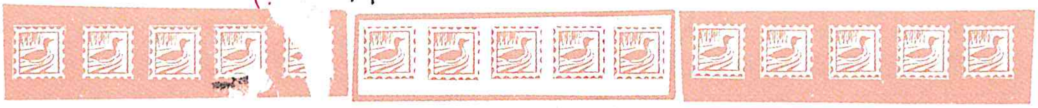
h. Four 2¢ stamps cost 8 ¢.

i. Two 7¢ stamps cost 14¢.

Be sure pupils know whether answer represents stamps or money.

Sue bought these stamps.

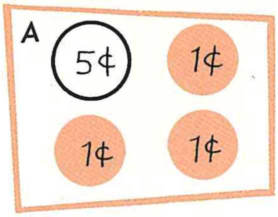




FOLLOW-UP: Have pupils originate number stories using pictures on this page. Help with addition if the amounts get too high.

(G56) AIMS: Practice counting money; determine number of stamps which can be bought for amounts of money; drill on multiplication facts through 2 sevens.
ACTIVITIES: F9–12 (G119)
PROCEDURES: Discuss the procedure for Ex. 1 and 2. "What coins are in the pictures?"

HOW MANY CAN YOU BUY?

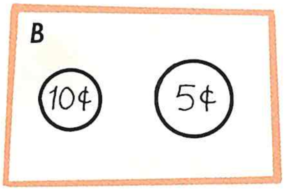


1. Picture A shows how much money? 8¢

5¢ + 3 ¢ = 8¢

How many 2¢ stamps will 8¢ buy? 4

How many twos in 8? 4 How many fours in 8? 2



2. Picture B shows how much money? 15¢

How many 3¢ stamps can you buy? 5

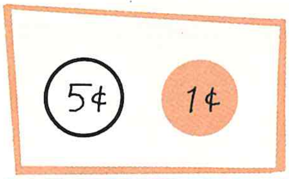
How many 1¢ stamps can you buy? 15

This may be used again, finding how many of each kind child can buy at the same time.

Encourage use of picture line as needed.

How mar[illegible]amps of each kind [illegible]an you buy? Question pupils about change they may have left.

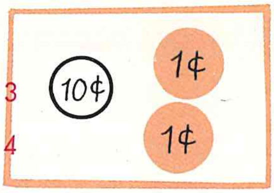
How much?

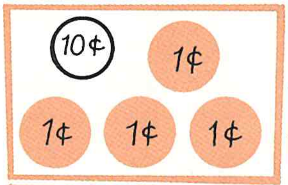


3¢ stamps 2
1¢ stamps 6

How much?

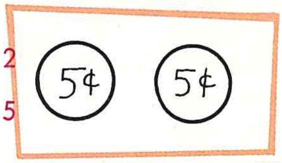
4¢ stamps 3
3¢ stamps 4

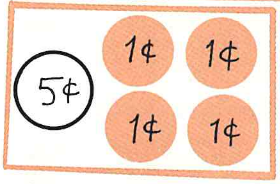




2¢ stamps 7
3¢ stamps 4

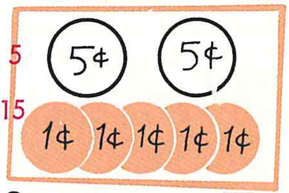
5¢ stamps 2
2¢ stamps 5





2¢ stamps 4
8¢ stamps 1

3¢ stamps 5
1¢ stamps 15



3. 2 fours = 8
2 sixes = 12
3 threes = 9
2 fives = 10

3 fives = 15
3 fours = 12
2 threes = 6
4 threes = 12

2 sevens = 14
3 ones = 3
7 twos = 14
9 ones = 9

FOLLOW-UP: F13 (G119)

(G56) AIMS: Add money in columns; use multiplication and division facts with money.
ACTIVITIES: F9–12 (G119)
PROCEDURES: Let the class discuss the stamps, and tell what they know about collecting stamps. Call attention to the pictures at the bottom of the page. Have pupils determine the amount of money each boy has. When children understand the procedure have them write answers to Ex. 1–4.

USING MONEY

7¢

3¢

4¢

2¢

If necessary review some multiplication and division facts.
(☐ twos = 12
☐ threes = 15
4 threes = ☐, and so on.)

The boys are collecting stamps.

1. How much money has each boy?
2. How many fish stamps can Carl buy? 3
   How many can Bill buy? 2
   Will each boy have some money left? Yes How much? 1¢, 3¢
3. How many 7¢ stamps can John buy? 2
   How much money will he have left? 1¢
4. How many 3¢ stamps can each boy buy?
   Write the boys' names and your answers.

See teaching suggestions. (G56)

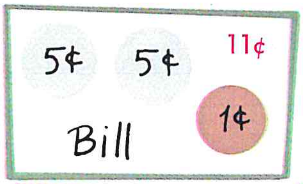
Dramatize some of the exercises, using toy money and cancelled stamps.

Bill 3
Joe 5
Tom 4
Ralph 4
Carl 4
John 5

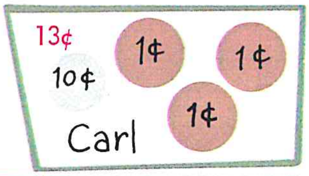
5.

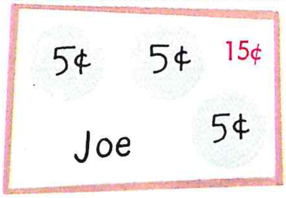
7¢	6¢	2¢	2¢	8¢	7¢
3¢	2¢	9¢	4¢	3¢	2¢
2¢	4¢	4¢	6¢	4¢	5¢
12 ¢	12 ¢	15 ¢	12 ¢	15 ¢	14 ¢

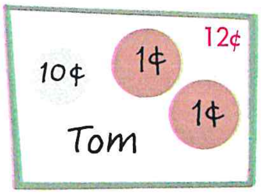
Review procedure for adding 3 numbers.

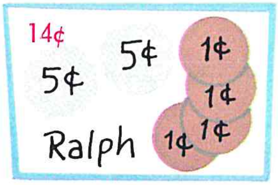


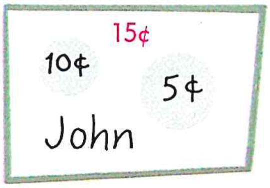
7¢ + 3¢ + 4¢ = 14 ¢
4¢ + 4¢ + 3¢ = 11 ¢









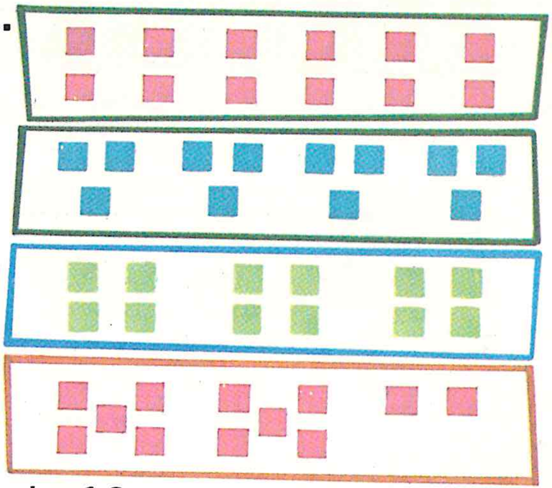


FOLLOW-UP: Oral stories about buying stamps.

(G57) AIMS: Study sets containing 12–15 objects; use equal sets to explore multiplication facts with products of 12–15 and related division facts; understand the meaning of remainders in division.
ACTIVITIES: A11, 12 (G106)
PROCEDURES: Have pupils determine the number of objects in each picture. Stress odd and even number concept. Accept zero as a remainder, but do not insist on it.

FINDING EQUAL SETS

Help children use markers to separate subsets. They may add or multiply to find totals.

1. 

In 12

a. How many twos? 6
Is anything left? No, or 0

b. How many threes? 4
What is left? 0

c. How many fours? 3
What is left? 0

d. How many fives? 2
What is left? 2 ones

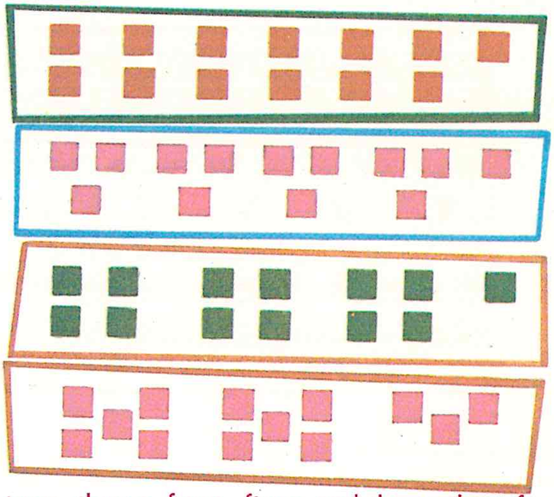
2. In 13

a. How many twos? 6
What is left? 1 one

b. How many threes? 4
What is left? 1 one

c. How many fours? 3
What is left? 1 one

d. How many fives? 2
What is left? 3 ones



For each picture have pupils write the number of twos, threes, fours, fives, and the number of objects left, if any.

3.

a

12 = 4 threes
2 sixes = 12
12 = 3 fours
4 threes = 12
6 twos = 12

Ex. 3 should be used orally in a game situation.

b

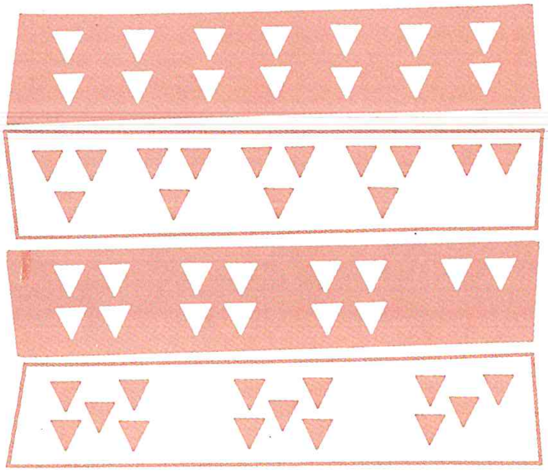
2 fives = 10
4 twos = 8
3 threes = 9
3 fours = 12
6 twos = 12

Continue on page 90.

Ex. 4 and 5 should be carried out in the same way as 1 and 2. Ex. 6 tests the pupils' understanding of the multiplication and division facts. Help them refer to the pictures as needed.

Exercises on page also give opportunity to review counting by 2's, 3's, 4's.

4. In 14



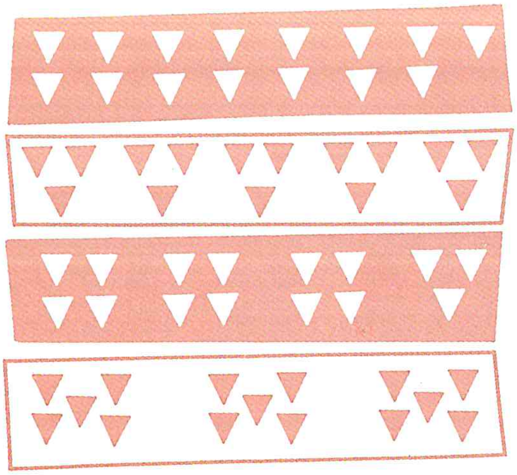
a. How many twos? 7
What is left? 0

b. How many threes? 4
What is left? 2 ones

c. How many fours? 3
What is left? 2 ones

d. How many fives? 2
What is left? 4 ones

5.



In 15

a. How many twos? 7
What is left? 1 one

b. How many threes? 5
What is left? 0

c. How many fours? 3
What is left? 3 ones

d. How many fives? 3
What is left? 0

Ex. 6 and 7. May be written work.

6. 5 threes = $\boxed{15}$
$\boxed{7}$ twos = 14
$\boxed{3}$ fives = 15
$\boxed{2}$ sevens = 14
15 = $\boxed{3}$ fives
$\boxed{3}$ fours = 12

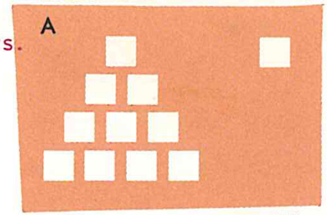
7. Find the answers.

$$\begin{array}{r} 6 \\ +\boxed{7} \\ \hline 13 \end{array} \qquad \begin{array}{r} \boxed{6} \\ +9 \\ \hline 15 \end{array} \qquad \begin{array}{r} 4 \\ +9 \\ \hline \boxed{13} \end{array} \qquad \begin{array}{r} 8 \\ +\boxed{7} \\ \hline 15 \end{array} \qquad \begin{array}{r} 15 \\ -\boxed{5} \\ \hline 10 \end{array} \qquad \begin{array}{r} 15 \\ -\boxed{6} \\ \hline 9 \end{array} \qquad \begin{array}{r} 13 \\ -6 \\ \hline \boxed{7} \end{array}$$

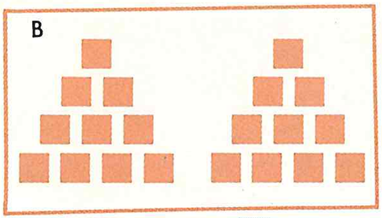
FOLLOW-UP: Give more practice on number facts as need is indicated.
ACTIVITIES: A14 a–c; B 3 f (G107).

(G58) AIMS: Practice addition and subtraction; review the "teen" numbers.
ACTIVITIES: B18 a–e, 19 (G111)
PROCEDURES: Discuss the pictures, the number sentences and the number words. Use some chalkboard experiences having children match "teen" words and numbers.

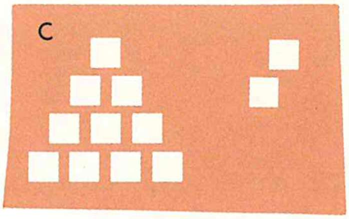
ELEVEN THROUGH FIFTEEN



A One ten + 1 = 11
eleven



B One ten = 10
two tens = 20

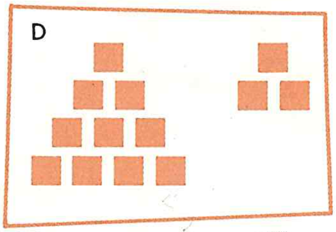


C One ten + 2 = 12
twelve

Relate 10 + 1 to (9 + 1) + 1 to 9 + 2 and so on. See G58. Guide pupils in "if–then" thinking.

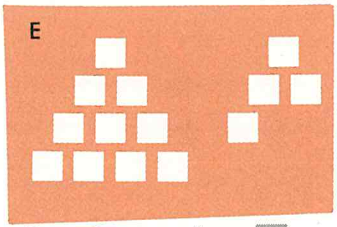
1.

a	b
10 + △1 = 11	9 + △3 = 12
10 + △5 = 15	9 + △6 = 15
10 + △2 = 12	9 + △2 = 11
10 + △4 = 14	9 + △5 = 14
10 + △3 = 13	9 + △4 = 13



D One ten + 3 = 13
thirteen

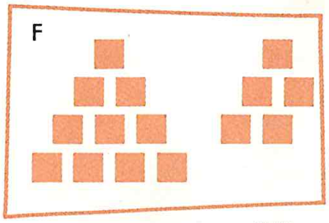
Use markers with the pictures to show other number facts: 7 + 7, 8 + 7, 6 + 8 and so on.



E One ten + 4 = 14
fourteen

2.

a	b
15 − △5 = 10	15 − 10 = △5
13 − △3 = 10	12 − 10 = △2
11 − △1 = 10	13 − 10 = △3
14 − △4 = 10	14 − 9 = △5
12 − △2 = 10	11 − 9 = △2



F One ten + 5 = 15
fifteen

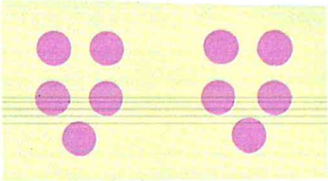
Give some oral work in which a child names a "teen" number and the others write numerals.

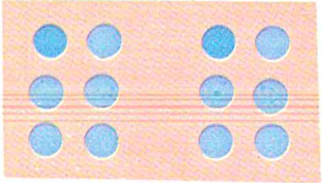
3. 13 − 9 = △4
12 − 9 = △3
15 − 9 = △6
10 − 9 = △1

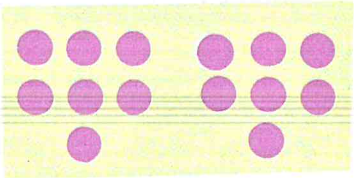
FOLLOW-UP: B18 a–e, 19 (G111)

(G58–59) AIMS: Learn to use doubles facts to find answers for near doubles facts.
ACTIVITIES: E 7 and 8 (G118)
PROCEDURES: As the pupils study the pictures, they should arrive at the correct fact because of the identical frames. Use G58–59 for additional practice. preparatory exercises

USING THE DOUBLES


5 + 5 = 10


6 + 6 = 12


7 + 7 = 14

1. Use the doubles to help you.

Have pupils show on pictures how they used doubles to help find answers. "6 + 6 = 12 so 6 + 5 = 11 and 5 + 6 = 11, or 5 + 5 = 10 and 1 more is 11, so 5 + 6 = 11."

a	b	c
5 + 5 = 10	6 + 6 = 12	7 + 7 = 14
5 + 6 = 11	6 + 5 = 11	7 + 6 = 13
5 + 4 = 9	6 + 7 = 13	7 + 8 = 15
10 − 5 = 5	12 − 6 = 6	14 − 7 = 7
9 − 4 = 5	11 − 5 = 6	13 − 6 = 7

2. Find the answers.

"Show which doubles helped you with these examples."

a	b	c
4 + 6 = 10	7 + 5 = 12	3 + 5 = 8
6 + 8 = 14	8 + 6 = 14	8 + 7 = 15

3. Find the answers.

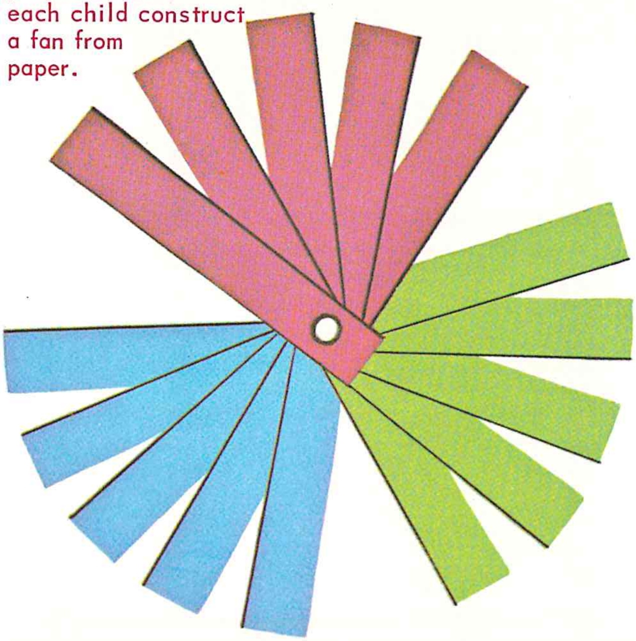
Use Ex. 3 first as a written lesson. Then divide the class into teams and use Ex. 3 as oral work.

a	b	c
10 − 5 = 5	12 − 6 = 6	14 − 7 = 7
9 − 5 = 4	11 − 6 = 5	13 − 7 = 6
8 − 4 = 4	12 − 5 = 7	14 − 2 = 12
11 − 6 = 5	13 − 6 = 7	15 − 7 = 8
10 − 6 = 4	12 − 4 = 8	15 − 6 = 9
6 + 7 = 13	8 + 7 = 15	5 + 7 = 12
5 + 6 = 11	7 + 8 = 15	5 + 8 = 13

FOLLOW-UP: E 7, 8 (G118)

(G59) AIMS: Practice facts with sums to 15 and related subtraction facts.
ACTIVITIES: B18 a–e, 19, 20 a–e (G111)
PROCEDURES: Guide pupils to discover as many number combinations as they can using the fan. See G59. If practical have each child construct a fan from paper.

WORKING WITH A NUMBER FAN



1. How many blue strips has the fan? 5
How many red strips? 5

How many strips in all? 15
5 + 5 + 5 = ▲ 15

2. Find 4 strips.
Show 7 more strips.
4 + 7 = ▲ 11

Have a pair of children make a list of facts for 11. Another pair could list facts for 13 and so on. Encourage checking answers on the fan.

3. Show 12 strips. Cover 8 of them. 12 − 8 = ▲ 4

Children may show addition facts on the fan and then write the inverses. (12 + 3 = 15, 15 − 3 = 12)

Find the answers.

Ex. 4 and 5 may be written or oral.

4.	11	14	13	15	14	11	13
	− 7	− 5	− 8	− 6	− 7	− 5	− 4
	4	9	5	9	7	6	9
5.	4	9	4	8	7	6	3
	+8	+6	+6	+7	+4	+8	+8
	12	15	10	15	11	14	11
6.	3	12	15	7	9	14	13
	+9	− 3	− 8	+5	+5	− 3	− 7
	12	9	7	12	14	11	6

FOLLOW-UP: Have children make up number sentences themselves and show the story with the number fan.

(G59–60) AIMS: Read number words; match number words and numerals; write numerals.
ACTIVITIES: Adapt any in B (G107). Review "numeral," "number," and "match."
PROCEDURES: Give help on reading the number words in Ex. 1. Discuss what each word means. Lead children to tell what they know about the "teens." Children may be encouraged to write other names for these numbers: sixteen, 10 + 6 or 10 + 5 + 1, and so on.

NUMERALS AND NUMBER WORDS

1. Match the numeral and the number word.

"What does 'Teen' mean? Fourteen shows 10 + □." "What does eleven mean?"

a	b	c	d
fourteen	13	ten	20
eleven	15	fifty	10
twelve	11	twenty	50
thirteen	14	forty	60
sixteen	17	thirty	40
eighteen	12	sixty	30
fifteen	19	eighty	70
nineteen	16	seventy	90
seventeen	18	ninety	80

In Ex. 2 and 3 pupils can test their ability to write the numerals from one designated number to another. Work through one or two examples orally first. Ask who can explain what happens when numerals are written in sequence. (You show you are adding 1 to each number or subtracting 1 from each.) "What happens when you write 1, 3, 5, 7, 9, and so on?" (added 2 each time)

2. Write the numerals from:

a. 17 to 10
b. 32 to 25
c. 50 to 41
d. 89 to 60
e. 109 to 98
f. 150 to 142
g. 119 to 106
h. 138 to 128
i. 109 to 99

3. Write the numerals from:

a. 9 to 22
b. 26 to 45
c. 76 to 86
d. 87 to 121
e. 128 to 144
f. 49 to 56
g. 99 to 111
h. 125 to 131
i. 9 to 19

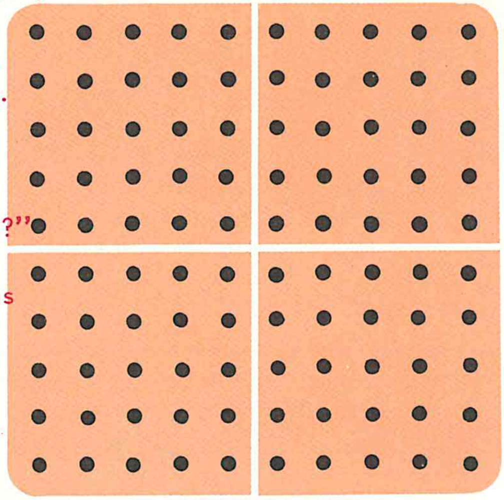
FOLLOW-UP: Extend idea of sequence to moving by 2's, 5's, and so on.

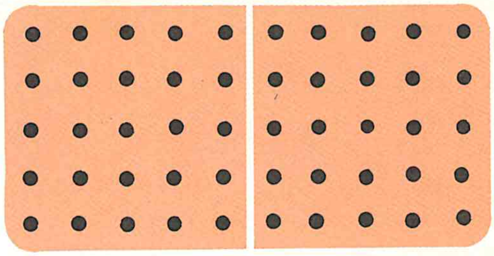
(G60–61) AIMS: Review numbers to 15; review relationships of adding and subtracting tens.
ACTIVITIES: D16 (G116)
PROCEDURES: Review the meaning of "plus" and "minus." Discuss the charts in terms of tens, fives, how many in each illustration, how many tens in 100, in 50. Guide pupils to use the dot pictures as they try to work out answers.

HUNDREDS AND TENS

"Show 4 rows. How many tens in 4 rows?"

"5 tens are how many rows? 5 tens = ☐"





1. What is the number?

Call attention to the place of the '1' in 100, 120, etc.

1 hundred + 4 tens = 140
1 hundred + 2 tens = 120
1 hundred + 3 tens = 130
1 hundred + 1 ten = 110
1 hundred + 5 tens = 150
1 hundred + 0 tens = 100

2. How many?

Help pupils make the generalization that adding tens is like adding ones.

8	8 tens	80
+5	+5 tens	+50
13	13 tens	130
9	9 tens	90
+6	+6 tens	+60
15	15 tens	150
6	6 tens	60
+8	+8 tens	+80
14	14 tens	140
5	5 tens	50
+5	+5 tens	+50
10	10 tens	100

3. How many?

Have pupils think of other related examples, similar to Ex. 3.

11	11 tens	110	12	12 tens	120
− 6	− 6 tens	−60	−8	−8 tens	− 80
5	5 tens	50	4	4 tens	40

12 tens	120	15 tens	150	14 tens	140
− 4 tens	− 40	− 7 tens	− 70	− 7 tens	− 70
8 tens	80	8 tens	80	7 tens	70

FOLLOW-UP: D16–18 (G116)

(G61–62) AIMS: Extend understanding of doubles; associate doubles and near doubles; practice adding and subtracting 2-digit numbers; subtracting 2-digit numbers from 3-digit sums.
ACTIVITIES: D16–18 (G116)
PROCEDURES: Review doubles less than 5 + 5 and their inverses. Have pupils do Ex. 1 orally and tell which doubles fact in the boxes is helpful.

PUTTING FACTS TO WORK

1. Doubles facts can help you.

10 − 5 = 5
5 + 5 = 10

12 − 6 = 6
6 + 6 = 12

14 − 7 = 7
7 + 7 = 14

11	6	8	5	12	13	15	12
− 5	+7	+7	+6	− 7	− 6	− 7	− 5
6	13	15	11	5	7	8	7

In Ex. 2 foster an "if–then" type of thinking as you guide pupils through the exercise. Help pupils use exercises in the boxes to guide them to correct answers.

2. Use what you know about 10.

15 − 5 = 10

11 − 1 = 10

13 − 3 = 10

14	15	10	11	12	13
− 5	− 4	− 1	− 2	− 3	− 4
9	11	9	9	9	9

In Ex. 3 you may want to review adding and subtracting tens before pupils write answers. Caution children to watch for the plus and minus signs.

3. Find the answers.

a.	15¢	35¢	47¢	50¢	28¢	17¢	31¢
	+20¢	+12¢	−24¢	−20¢	−11¢	+22¢	+48¢
	35¢	47¢	23¢	30¢	17¢	39¢	79¢

b.	80	82	40	43	60	63	63
	+50	+52	−20	−33	+50	+53	−53
	130	134	20	10	110	116	10

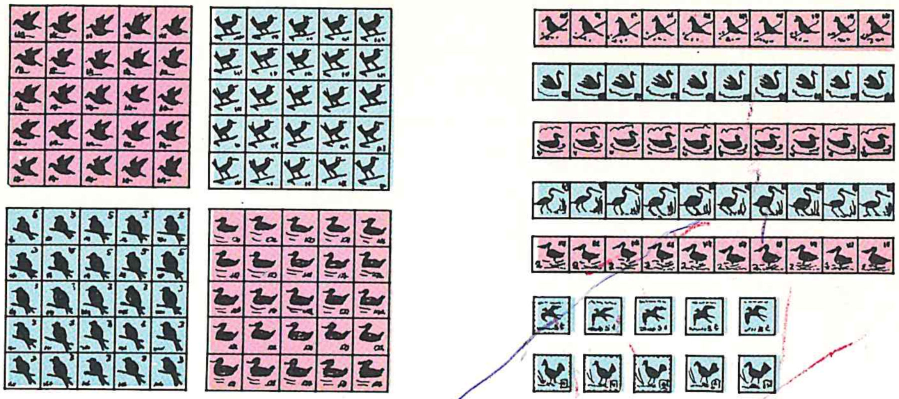
c.	120	126	70	74	150	154	154
	− 30	− 33	+70	+73	− 80	− 80	− 82
	90	93	140	147	70	74	72

FOLLOW-UP: Extend lesson with more chalkboard examples. Plan review of number facts for pupils who need it.

(G62) AIMS: Continue emphasis on meaning of numbers from 1 – 150.
ACTIVITIES: D 16–18 (G116)
PROCEDURES: Discuss the pictures; how many in each block or strip. How can they show different numbers of stamps? 120? 140? 150?

WHAT IS THE NUMBER?

"How many stamps in each colored block?" "How many in 1 row?"



1. Show 100 stamps. Show 30 more stamps.

100 + 30 = 130

Show 4 more stamps.

100 and 30 and 4 = 100 + 30 + 4 = 134

a. What is the number?

100 stamps + 40 stamps + 7 stamps = 147 stamps

100 + 50 + 7 = 157 100 + 70 + 3 = 173

b. 100 + 20 + 2 = 122 100 + 10 + 8 = 118

Ex. 2. Review place value. Stress importance of position of numerals.

2. Find numerals for these in picture A.

1 hundred + 3 tens + 0 ones

1 hundred + 2 tens + 7 ones

100 + 50 + 2

100 + 60 + 9

How could they show each number in Ex. 2 on the pictures of stamps? Guide them to see they would need 9 more stamps to show 169.

A

Hundreds	Tens	Ones
1	3	0
1	6	9
1	5	2
1	2	7

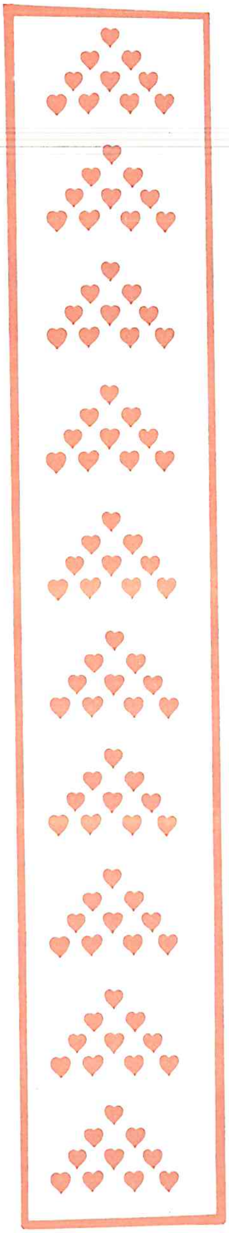
3. Write these numerals on your paper showing hundreds, tens, ones.

110, 149, 183, 99, 175, 199, 68, 129, 155

FOLLOW-UP: Give more opportunities to write numerals showing hundreds, tens, ones.

(G62–63) AIMS: Practice on multiplication and division facts for fives through 50 and for tens through 100.
ACTIVITIES: D1, 2, 3 (G114)
PROCEDURES: Discuss the pictures. How many tens? fives? In Ex. 1 pick examples at random and have children show pictures that illustrate. Give some practice in reading the number sentences correctly. See G63.

FIVES AND TENS



1. Find the number.

5 tens = 50
3 tens = 30
6 tens = 60
2 tens = 20
7 tens = 70
9 tens = 90
4 tens = 40
8 tens = 80
10 tens = 100
1 ten = 10

2. How many?

5 tens = 50
2 tens = 20
8 tens = 80
3 tens = 30
1 tens = 10
9 tens = 90
7 tens = 70
4 tens = 40
6 tens = 60
10 tens = 100

Guide the class in using the pictures if they need help.

3. Find the number.

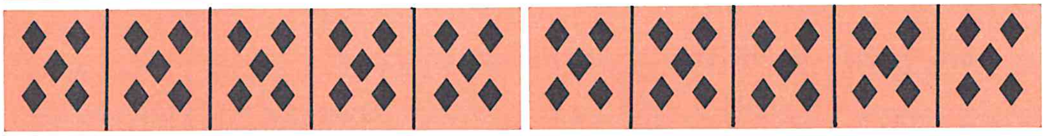
3 fives = 15
5 fives = 25
6 fives = 30
2 fives = 10
1 five = 5
4 fives = 20
8 fives = 40
7 fives = 35
9 fives = 45
10 fives = 50

4. How many?

2 fives = 10
1 fives = 5
4 fives = 20
5 fives = 25
3 fives = 15
6 fives = 30
9 fives = 45
8 fives = 40
10 fives = 50
7 fives = 35

Which examples in Ex. 3 and 4 could they show with sets of tens?

Compare some answers in Ex. 2 and 4. "How many 10's in 30? How many 5's?"



FOLLOW-UP: Use classroom collections of money to reinforce children's understanding of multiplication and division facts for 5 and 10.

(G63) AIMS: Understand numbers from 1–50; relate adding and subtracting tens to adding and subtracting ones.
ACTIVITIES: D7, 8, 9 (G115)
PROCEDURES: Give help in reading and interpreting the sentences in Ex. 1. Assist pupils to think in terms of number sentences where needed. 59–2 tens = 59 − 20 = 39. Use dot chart or 100 board for illustrations.

PRACTICE WITH TENS AND ONES

1. What is the number?

- **a.** 4 tens, 0 ones = 40
- **b.** 2 tens less than 59 = 39
- **c.** 3 tens more than 30 = 60
- **d.** 5 tens, 6 ones = 56
- **e.** 2 ones more than 70 = 72
- **f.** 2 ones less than 35 = 33
- **g.** 5 ones more than 8 tens = 85
- **h.** 3 ones, 6 tens = 63
- **i.** 4 ones less than 48 = 44

2. What is the number?

Explain Ex. 2 as riddles for which children must find answers.

It has: 0 tens
1 hundred
4 ones
It is 104.

It has: 0 ones
6 tens
1 hundred
It is 160.

3. Find the answers.

See suggestions (G63) for thinking steps for Ex. 3 and 4.

3	30	6	60	6	60	8	80
+8	+80	+7	+70	+9	+90	+7	+70
11	110	13	130	15	150	15	150

4. Find the answers.

12	120	14	140	15	150	13	130
− 6	− 60	− 8	− 80	− 9	− 90	− 5	− 50
6	60	6	60	6	60	8	80

FOLLOW-UP: Place other riddles similar to those in Ex. 2 on the chalkboard for pupils to solve. Let children make up some similar riddles.

(G63–64) AIMS: Review and maintain concepts taught in Chapter 5.
PROCEDURES: Observe children as they work. Check answers for indications of misunderstanding, counting, guessing. Have number lines, fans or charts in sight for use if needed. If reteaching is indicated, use the page again later as a test of pupils' understanding.

DO YOU REMEMBER?

1. Write the answers.

20	70	90	80	120	120	70
+30	+20	−40	−20	+ 30	− 30	+70
50	90	50	60	150	90	140

2.

8	15	10	15	12	14	15
+7	− 6	+ 5	−10	+ 3	+ 1	− 4
15	9	15	5	15	15	11

3.
5 threes = 15 | 7 twos = 14 | 4 threes = 12
3 fives = 15 | 2 sevens = 14 | 2 sixes = 12

4. Write the numerals.

a.	thirteen 13	seventeen 17	12 tens 120
b.	5 tens, 6 ones 56	ninety-six 96	15 tens 150
c.	8 tens, 0 ones 80	seventy-five 75	nineteen 19
d.	thirty-eight 38	11 tens 110	forty 40
e.	eleven 11	one hundred 100	sixteen 16

5. Write the numerals.
one hundred plus two tens plus three ones 123
one hundred plus five tens plus zero ones 150
one hundred plus sixteen ones 116
1 hundred + 4 tens + 5 ones 145
100 + 30 + 7 137
100 + 6 106

FOLLOW-UP: Give help wherever the review lesson reveals lack of understanding.

(G64–65) AIMS: Test addition and subtraction facts 11 – 14. Review concepts taught thus far.
PROCEDURES: Pupils should try to write answers for each exercise without reference to aids or pictures. See G64 for suggestions on keeping individual test records.

DO YOU KNOW?

1. Find the answers.

a.	4	8	5	7	8	6
	+7	+5	+9	+6	+4	+5
	11	13	14	13	12	11
b.	9	7	5	6	2	8
	+4	+7	+7	+6	+9	+6
	13	14	12	12	11	14

2. Find the answers.

a.	11	12	14	13	11	12
	− 8	− 3	− 8	− 6	− 9	− 5
	3	9	6	7	2	7
b.	11	14	14	13	11	12
	− 6	− 6	− 7	− 9	− 4	− 8
	5	8	7	4	7	4

3. Write the missing numerals.

a. 8 + 3 = 11 13 − 6 = 7 13 − 7 = 6
b. 3 + 9 = 12 14 − 6 = 8 11 − 2 = 9
c. 5 + 8 = 13 14 − 6 = 8 12 − 8 = 4
d. 8 + 5 = 13 12 − 9 = 3 14 − 9 = 5
e. 5 + 9 = 14 12 − 6 = 6 11 − 4 = 7

f. How many:
threes in 12? 4 twos in 12? 6 threes in 15? 5
fives in 15? 3 twos in 14? 7 sevens in 14? 2

Continue on page 102.

You may wish to give the Do You Know? test in two sections. Children may copy and complete examples or use answer strips.

4. Write the missing numerals.

a	b	c
65 + 3 = 68	70 + 2 = 72	35 + 5 = 40
71 + 7 = 78	64 + 4 = 68	24 + 5 = 29
84 + 2 = 86	34 + 5 = 39	63 + 3 = 66
16 + 3 = 19	55 + 3 = 58	75 + 2 = 77
23 + 3 = 26	30 + 6 = 36	81 + 7 = 88

d	e	f
16 − 3 = 13	86 − 4 = 82	58 − 5 = 53
49 − 2 = 47	30 − 3 = 27	77 − 6 = 71
96 − 4 = 92	39 − 5 = 34	85 − 4 = 81
87 − 2 = 85	49 − 6 = 43	99 − 6 = 93
68 − 7 = 61	56 − 4 = 52	36 − 4 = 32

5. Find the answers.

a	b	c
6 + 6 = 12	14 − 7 = 7	14 − 10 = 4
6 + 7 = 13	13 − 7 = 6	14 − 9 = 5
7 + 7 = 14	12 − 6 = 6	14 − 5 = 9
7 + 6 = 13	13 − 6 = 7	14 − 6 = 8
5 + 5 = 10	11 − 5 = 6	13 − 5 = 8
6 + 5 = 11	12 − 5 = 7	13 − 4 = 9

FOLLOW-UP: Sections A–J (G105) as needed.

(G65) AIMS: Encourage independent thinking; use number facts to supply missing numbers to make true sentences.
PROCEDURES: Be sure children understand what is required.
In Ex. 1 each pair of sentences takes the same numeral.

ENRICHMENT

1. Write a numeral for the square that will make both sentences true.

a. $24 + \boxed{10} = 34$
$36 - \boxed{10} = 26$

b. $\boxed{5} + 14 = 19$
$19 - \boxed{5} = 14$

c. $\boxed{3}$ fours = 12
$\boxed{3} + 9 = 12$

d. $16 - \boxed{7} = 9$
$15 - \boxed{7} = 8$

2. Write numerals for the square and for the triangle that will make both sentences true. Write each pair of sentences three ways.

Answers for Ex. 2 will vary. Accept any correct combinations.
For example:
14 − 5 = 9
9 + 5 = 14
or
14 − 3 = 11
11 + 3 = 14
etc.

Notice whether children have a grasp of many facts or are using patterns like 14 − 1, 14 − 2, 14 − 3, repeatedly.

a. $14 - \blacksquare = \blacktriangle$
$\blacktriangle + \blacksquare = 14$

b. $13 - \blacksquare = \blacktriangle$
$\blacktriangle + \blacksquare = 13$

c. $11 - \blacksquare = \blacktriangle$
$\blacktriangle + \blacksquare = 11$

d. $12 - \blacksquare = \blacktriangle$
$\blacktriangle + \blacksquare = 12$

14 − 7 = 7 and 7 + 7 = 14 are also correct.

3. Make up some pairs of number sentences so the same numbers will make both sentences true.

This exercise will test children's imaginations. You may wish to limit the exercise to 3 or 4 pairs. Use Ex. 2 as a model.

4. Write the missing numerals. Look for the patterns.

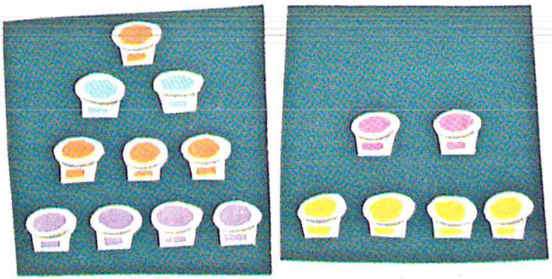
$11 - 5 = 12 - \boxed{6} = 13 - ⑦ = N$ = 6
$11 - 1 = 12 - \boxed{2} = 13 - ③ = N$ = 10
$10 - 7 = 12 - \boxed{9} = 14 - ⑪ = N$ = 3
$10 - 3 = 12 - \boxed{5} = 14 - ⑦ = N$ = 7

Encourage careful reading in Ex. 4. One example might be done at the chalkboard, to show procedures:

$\underbrace{11 - 5}_{6} = \underbrace{12 - 6}_{6} = \underbrace{13 - 7}_{6}$ So N = 6.

(G66–68) AIMS: Explore sets and subsets of 13 – 16 objects.
ACTIVITIES: A11, 12 (G106)
PROCEDURES: Guide pupils in using the pictures to carry out the following: Determine the number of cartons; call attention to the familiar 10 grouping; review adding 10 and 1, 10 and 2 and what these numbers are called. (teens)

EXPLORING 13 THROUGH 16



10 + 6 = 16

1.

a	b
10 + 1 = 11	10 + 2 = 12
10 + 3 = 13	10 + 4 = 14
10 + 5 = 15	10 + 6 = 16
6 + 10 = 16	3 + 10 = 13

Discuss the examples in Ex. 2 in terms of subtracting 10 and subtracting to get 10. Have the children think of other examples not in Ex. 2.

2. Use the picture to show:

16 − 6 = 10   15 − 5 = 10   14 − 4 = 10
16 − 10 = 6   14 − 10 = 4   15 − 10 = 5

3. Use your markers to show these facts. Cover the cartons you don't need.

You may need to demonstrate how this can be done.

a. 9 + 4 = 13   8 + 5 = 13   7 + 6 = 13
b. 9 + 4 = 9 + 1 + 3 = 10 + 3   9 + 6 = 10 + 5
c. 8 + 5 = 8 + 2 + 3 = 10 + 3   8 + 8 = 10 + 6
d. 7 + 6 = 7 + 3 + 3 = 10 + 3   7 + 8 = 10 + 5

Help pupils compare the size of sets on the picture line. "How could we write number sentences to show these?"

4. How many more are:

a. 16 cartons than 10 cartons? 6   9 than 3? 6
b. 15 cartons than 9 cartons? 6   11 than 5? 6
c. 14 cartons than 8 cartons? 6   12 than 6? 6

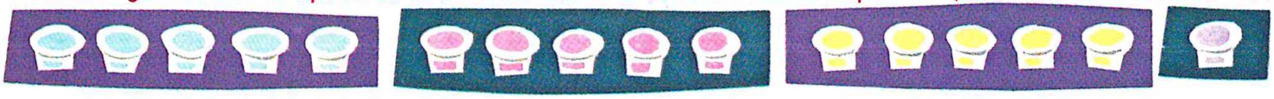
Find other sets with the same difference.

5. On the picture line, find 12; 15; 16.

a. 4 threes = 12   6 twos = 12   8 twos = 16
b. 5 threes = 15   3 fives = 15   3 fours = 12

6. 2 sevens = 7 twos = 14   2 eights = 8 twos = 16

Encourage children to speak of sets "that have the same number of objects." (G68 for distinction between equal and equivalent sets.)



Continue on page 105.

Children might try to write reverse multiplication facts for Ex. 5 like the ones in Ex. 6.

Find the answers.
Use the pictures on page 104 if you need help.

Encourage pupils who seem to have an abstract understanding of the facts to find answers without reference to pictures. Help others to use the pictures as an aid to abstract thinking. Encourage pupils to make up some similar examples.

7.

a	b	c
10 + 2 = 12	14 − 10 = 4	12 − 2 = 10
4 + 10 = 14	13 − 10 = 3	14 − 4 = 10
10 + 6 = 16	16 − 10 = 6	16 − 6 = 10
10 + 5 = 15	12 − 10 = 2	13 − 3 = 10
3 + 10 = 13	15 − 10 = 5	15 − 5 = 10

8.

a	b	c
6 + 9 = 15	12 − 4 = 8	16 − 7 = 9
8 + 6 = 14	14 − 8 = 6	13 − 5 = 8
4 + 9 = 13	15 − 9 = 6	14 − 9 = 5
5 + 7 = 12	16 − 8 = 8	16 − 9 = 7
7 + 9 = 16	15 − 7 = 8	13 − 7 = 6

9. Write the missing numerals.

a. 5 + 9 = 9 + 5   6 + 8 = 8 + 6
14 = 14   14 = 14

b. 7 + 8 = 8 + 7   9 + 7 = 7 + 9
15 = 15   16 = 16

Examples, Ex. 10: Suggest adding these in different order, Are answers the same?

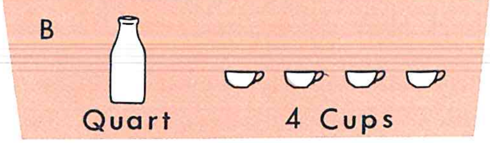
10.
9 + 5 + 2 = 16   10 + 1 + 3 = 14
7 + 6 + 2 = 15   12 + 2 + 2 = 16

FOLLOW-UP: A12, 13 (G107)

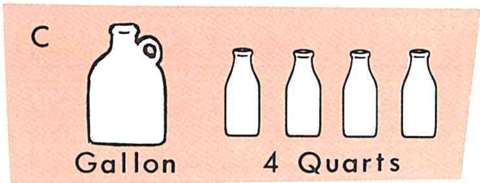
(G68–69) AIMS: Develop understanding of cups, pints, quarts, gallons; problem solving.
ACTIVITIES: F14 (G119)
PROCEDURES: Give help with new words in the pictures. Experiment with actual measures. Discuss what we buy in pints, quarts, gallons. Explore the pictured measures with the pupils. Use some chalkboard charts to develop relationships. See G68.

LIQUID MEASURE

1 pint = 2 cups
½ pint = 1 cup



1 quart = 4 cups
2 cups = 1 pint
2 pints = 1 quart



4 quarts = 1 gallon
2 quarts = ½ gallon

After oral discussion of Ex. 1 and 2, read aloud the story. (G68–69). Help children refer to the chalkboard charts for answers.

1. How many cups in 1 pint? 2
How many cups in 2 pints? 4
How many cups in 1 quart? 4
How many pints in 1 quart? 2
How many quarts in 1 gallon? 4
2 fours = 8   4 fours = 16

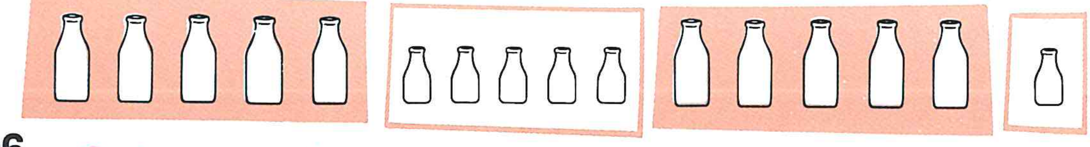
2. **a.** How many?
6 quarts + 5 quarts = 11 quarts
8 quarts + 7 quarts = 15 quarts
7 quarts + 6 quarts = 13 quarts

b. How many?
2 twos = 4
3 twos = 6
4 twos = 8

c. 2 threes = 6
5 threes = 15
3 threes = 9
4 threes = 12

Pupils may use picture line below to find answers.

3. One quart of milk makes 4 cups of cocoa.
Eight cups of cocoa will take 2 quarts.
There are 16 cups of cocoa for 8 children.
How many cups can each child have? 2
How many twos in 16? 8 How many eights in 16? 2



Continue on page 107.

As Ex. 4 and 5 are checked orally, encourage the children to tell a number story for each example. Reread the story. Let pupils find examples to fit the questions.

4. Tell a number story. Find the answers.

$$\begin{array}{r}4\\5\\7\\\hline \boxed{16}\end{array}\qquad\begin{array}{r}7\\+\ \boxed{6}\\\hline 13\end{array}\qquad\begin{array}{r}6\\+\ \boxed{5}\\\hline 11\end{array}\qquad\begin{array}{r}8\\+7\\\hline \boxed{15}\end{array}\qquad\begin{array}{r}\boxed{6}\\+7\\\hline 13\end{array}\qquad\begin{array}{r}2\\4\\3\\\hline \boxed{9}\end{array}\qquad\begin{array}{r}3\\2\\6\\\hline \boxed{11}\end{array}$$

5.

a

3 fours = 12
2 sixes = 12
4 twos = 8
8 twos = 16

b

6 twos = 12
3 threes = 9
5 threes = 15
4 threes = 12

Discuss the directions in Ex. 6. See who can remember the three things they are to do with each number story. Help them to see that more than one question can be asked about the same story.

6. Make up a question for each problem. Write the number sentence. Find the answer.

a. There are 4 in the Miller family and 7 in the Burns family.

b. Mrs. Sands gets 8 quarts of milk on Monday and 7 on Thursday.

c. The children drank 6 cups of milk. Mrs. Burns used 3 cups in cooking.

d. Mrs. Burns has 2 quarts of milk and 2 cups of milk.

Assist pupils to read names.

How many more? How many fewer? Total? and so on.

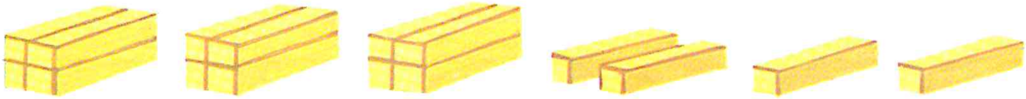
FOLLOW-UP: F15 (G119)

(G69–70): Develop relationship of pounds, half pounds, and quarter pounds; explore sets; discover multiplication facts. ACTIVITIES: A11, 12, 16 (G106)
PROCEDURES: Explain new words and discuss pictures. Which pictures show 1 pound, $\frac{1}{2}$ pound, $\frac{1}{4}$ pound? Note how we write these: $\frac{1}{2}$, $\frac{1}{4}$.

PARTS OF A POUND

$\frac{1}{2}$ means one half

$\frac{1}{4}$ means one fourth or one quarter



Have pupils count by fours to determine how many sticks of butter are in pictures. Help them to develop understanding that $\frac{1}{4}$ and $\frac{1}{4}$ are $\frac{1}{2}$. Work through all the exercises orally, using pictures to make concept clear.

1. How much butter is in one carton? 1 pound
   How many butter sticks are in one carton? 4
   2 sticks are how much butter? $\frac{1}{2}$ pound

2. Use the pictures to show:
   4 sticks are 1 pound.
   2 sticks are $\frac{1}{2}$ pound.
   $\frac{1}{2}$ pound and $\frac{1}{2}$ pound are 1 pound.
   1 stick is $\frac{1}{4}$ pound.
   $\frac{1}{4}$ pound and $\frac{1}{4}$ pound are $\frac{1}{2}$ pound.

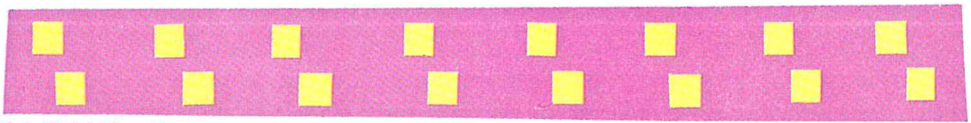
3. How many sticks make 2 pounds? 8 3 pounds? 12
   8 sticks make 2 pounds 2 fours = 8
   12 sticks make 3 pounds 3 fours = 12

4. How many sticks make 1 pound and $\frac{1}{2}$ pound? 6
   How many sticks make 2 pounds and $\frac{1}{2}$ pound? 10

Have children use the picture line of sticks of butter to carry out the guide suggestions. (See G69–70)

5. Count the butter sticks below by twos.
   Count them by fours.

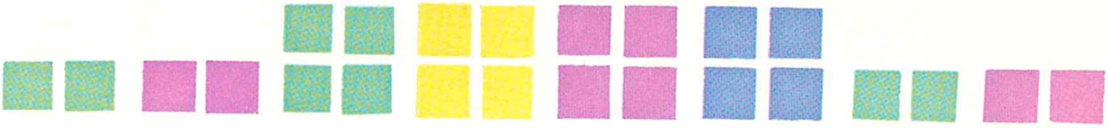
6. Write the missing numerals:
   2 4 6 8 10 12 14 16



FOLLOW-UP: Use concrete materials for children who need more help.

(G70) AIMS: Develop multiplication and division facts for twos, threes, fours; through 5 threes and 4 fours.
ACTIVITIES: A11, 12, 15 (G106)
PROCEDURES: Discuss the patterns of twos and fours in the pictures. How many sets of 2? of 4? In Ex. 1 find a number sentence about 2 fours; 4 fours; and so on.

TWOS, THREES, AND FOURS



Use the pictures to help you. Work through Ex. 1 orally.

1.

a	b	c
2 fours = 8	2 fours + 2 = 10	1 four + 9 = 13
4 fours = 16	3 fours + 4 = 16	1 four + 8 = 12
3 fours = 12	2 fours + 3 = 11	1 four + 7 = 11

Ex. 2 – 4 may be copied as independent work, checked and used later for written lessons.

2.

a	b
8 + 7 = 15	3 + 12 = 15
8 + 8 = 16	12 + 1 = 13
6 + 8 = 14	5 + 8 = 13

Review the doubles and near doubles of 4 + 4, 5 + 5, 6 + 6. "Who can find a doubles fact in Ex. 2? Find pictures above to show 8 + 8."

3.

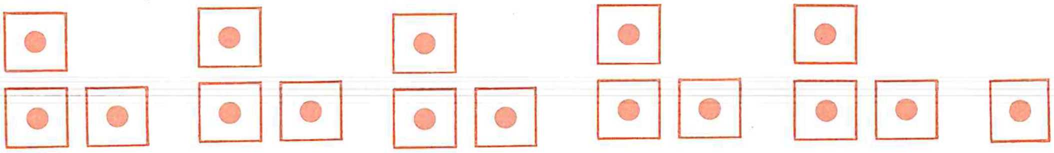
a	b	c
3 fours = 12	13 − 5 = 8	16 − 8 = 8
2 fours = 8	15 − 8 = 7	13 − 9 = 4
4 fours = 16	14 − 4 = 10	15 − 7 = 8

4.

a	b	c
2 twos = 4	4 twos = 8	7 twos = 14
4 twos = 8	2 twos = 4	2 twos = 1 four
8 twos = 16	6 twos = 12	4 twos = 2 fours
3 twos = 6	8 twos = 16	6 twos = 3 fours
6 twos = 12	5 twos = 10	8 twos = 4 fours

Continue on page 110.

Exercises on this page should be discussed orally. Guide pupils in using pictures at top and bottom. Develop the multiplication and division facts through 15.



How many boxes in each set? 3; 1

Count them by threes: 3, 6, 9, 12, 15.

There is one more box. How many in all? 16

See G70 for further oral work for this lesson.

5.

a	b	c
2 threes = 6	3 threes = 9	14 − 5 = 9
4 threes = 12	2 threes = 6	15 − 9 = 6
3 threes = 9	4 threes = 12	16 − 7 = 9
5 threes = 15	5 threes = 15	14 − 8 = 6
5 threes + 1 = 16		16 − 9 = 7

6.

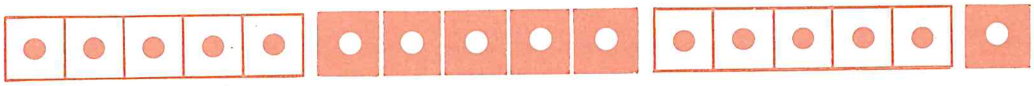
After oral work Exercises 5–7 may be written.

a	b
9 + 3 = 12	2 threes + 3 threes = 15
9 + 5 = 14	1 three + 2 threes = 9
6 + 8 = 14	4 threes + 1 three = 15
9 + 6 = 15	5 threes − 2 threes = 9
8 + 7 = 15	4 threes − 1 three = 9

Encourage pupils who need them to use pictures to find answers. Help them recognize the largest set they can and proceed from there.

7.

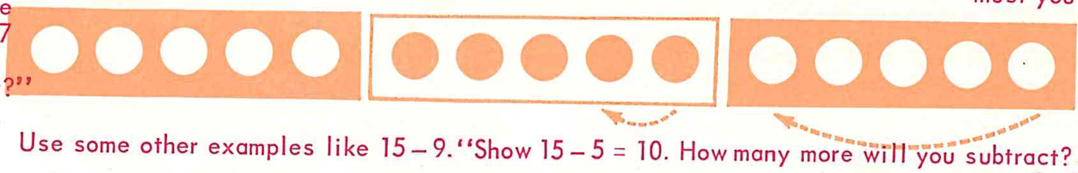
a	b	c
4 + 9 = 13	16 − 5 = 11	8 + 8 = 16
6 + 7 = 13	15 − 5 = 10	9 + 6 = 15
8 + 7 = 15	16 − 8 = 8	9 + 7 = 16
5 + 10 = 15	14 − 6 = 8	6 + 8 = 14
8 + 6 = 14	13 − 7 = 6	5 + 9 = 14



FOLLOW-UP: A15; B21 (G107)

(G70–71) AIMS: Discover answers to subtraction examples with minuends of 12–16.
ACTIVITIES: B5, 12, 18e (G109)
PROCEDURES: Guide children to use the picture line. "How many dots in all? What does the large arrow show? (You subtracted 5) How many more must you subtract to take away 7 altogether?" (2)

LET TEN HELP YOU SUBTRACT



Use some other examples like 15 – 9. "Show 15 – 5 = 10. How many more will you subtract? (4)" So 15 – 9 = ☐ (6)

1. What number do you subtract to get ten?

15   15 – ⑤ = 10
– 7   What other number do you subtract? Why?
8   10 – 2 = 8

Demonstrate each example on the bead line. Be sure pupils can explain how they know what to subtract in the second step.

Ask yourself the questions. Write the answers.

2. 16   16 – ⑥ = 10
– 9   10 – 3 = 7
7

12   12 – ② = 10
– 5   10 – 3 = 7
7

When pupils are sure of the steps have them complete Ex. 3–6 independently.

3. 14   14 – ④ = 10
– 6   10 – 2 = 8
8

13   13 – ③ = 10
– 7   10 – 4 = 6
6

Use these steps to help children who are unsure. Do not insist on this method for pupils who have a good control of facts.

4. 14   14 – ④ = 10
– 8   10 – 4 = 6
6

16   16 – ⑥ = 10
– 7   10 – 1 = 9
9

5. 13   13 – ③ = 10
– 5   10 – 2 = 8
8

15   15 – ⑤ = 10
– 8   10 – 3 = 7
7

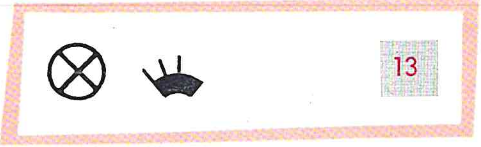
FOLLOW-UP: B6 (G109)

(G71–72) AIMS: Develop understanding of 2-place numerals; number names for tens and "teen" numbers; meaning of numbers composed of one ten and so many more.
ACTIVITIES: D6; B15 (G114)

NUMBERS AND NUMBER NAMES

PROCEDURES: Discuss the hand pictures relating them to the numeral which expresses the same idea. "What other way could you write the same number names?" (10 + 3
20 + 8 or
20 + 5 + 3,
and so on.)

1. Write the numerals for each picture.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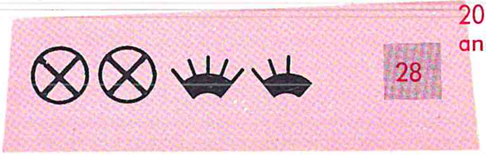
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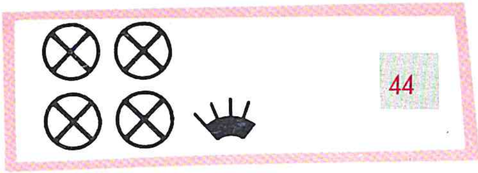
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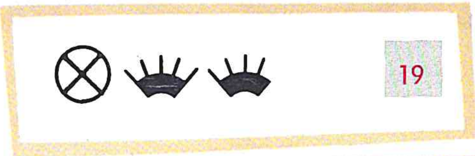
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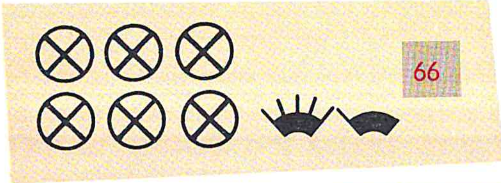
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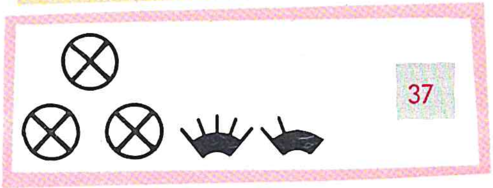
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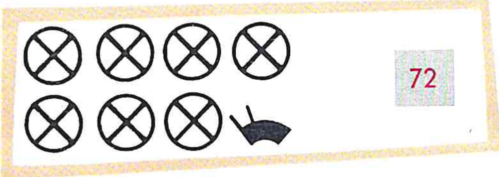
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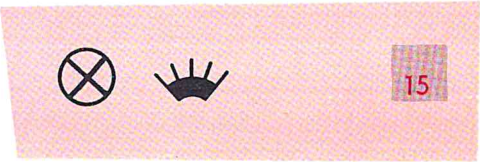

15

Children might also write the answers for Ex. 2 in terms of the number of tens. (2 tens, 4 tens)

2. Write the numerals for each number.

See also G71–72 for extended oral work.

twenty	20	fifteen	15	eighteen	18
forty	40	nineteen	19	seventeen	17
seventy	70	thirteen	13	eleven	11
fifty	50	sixteen	16	sixty	60
thirty	30	fourteen	14	eighty	80

As a preparation for Ex. 3 dictate the "teen" numbers in random order. Have pupils write numerals on the chalkboard.

3. Draw hand pictures to show:

twelve
18
51
twenty-two
16
eleven
13
sixteen
thirty-seven

Drawings need not be perfect as long as understanding is evident.

Continue on page 113.

For Ex. 5 and 6 use some chalkboard exercises to show the procedure. In Ex. 7 have the pupils name the shapes for each of these three games. The pupils should write the numerals for the numbers which result when they combine the tens and ones.

For Ex. 4 accept any correct answers. Pupils may think of 5 + 1, or 11 − 2. In that event make an exercise of writing simplest numerals, then subtraction facts and so on.

4. Write numerals for the words:

a. six 6 four 4 one 1
b. nine 9 twenty 20 zero 0
c. three 3 two 2 seven 7
d. five 5 eight 8 four 4

5. Write a 2-place numeral that has: See also G72.

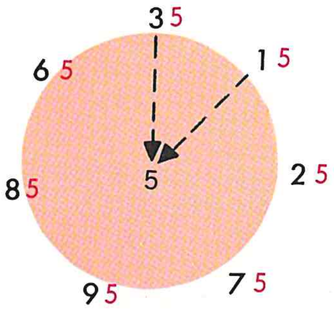
a. three ones 23, 33, . . . nine ones 19, 29, . . . four tens 40, 41, . . .
b. zero ones 10, 20, . . . six tens 60, 61, . . . three tens 30, 31, . . .

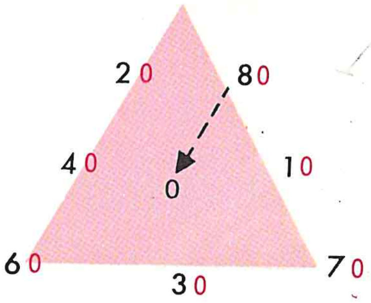
Some answers will vary.

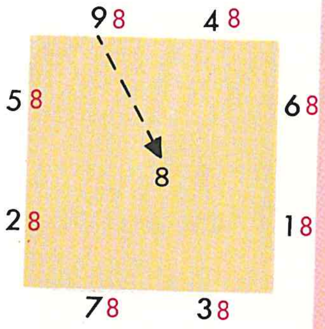
6. Write the numeral that has:

a. five ones and seven tens 75
b. four ones and nine tens 94
c. five tens and five ones 55
d. one ten and two ones 12
e. seven ones 7 If answers vary ask which is the simplest numeral.

7. The tens' numeral is on the outside.
The ones' numeral is in the middle.
Write the 2-place numerals.







FOLLOW-UP: Vary the game placing a tens' numeral in the center and ones' numerals around the outside of the figure.

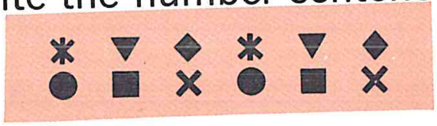
(G72–73) AIMS: Explore the numbers 12–16, finding subsets of 2's through 8's. Use subsets to rediscover addition and subtraction facts.
ACTIVITIES: A14a, c; B18b, c (G107)

FIND THE SUBSETS

PROCEDURES: Encourage pupils to discover the total counting in multiples. After oral work, have children write number sentences to describe total number of objects in each picture. Have pupils use markers to help separate subsets. "What can you discover about pictures in 1 and 2?" (Same total, in different arrays)

Write the number sentences.

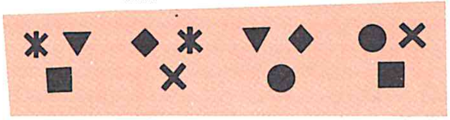
1.



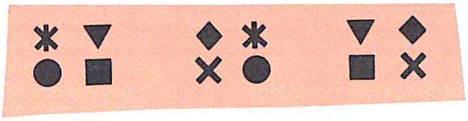
6 twos = 12

2 sixes = 12

2.



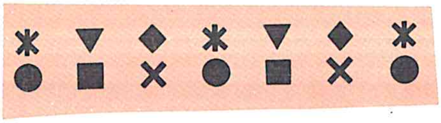
4 threes = 12



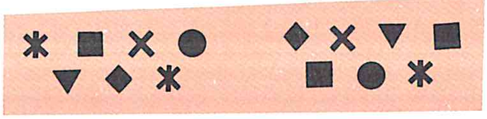
3 fours = 12

"With a marker show all the facts you can for 14."

3.

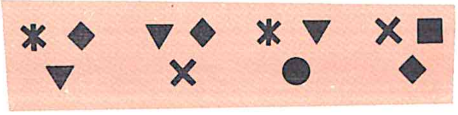


7 twos = 14

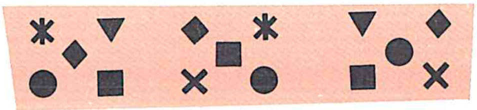


2 sevens = 14

4.

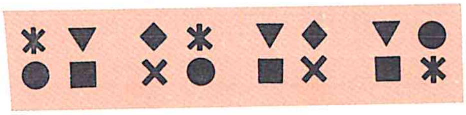


4 threes = 12

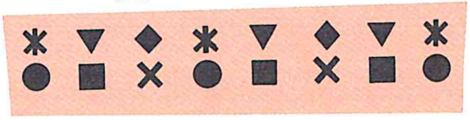


3 fives = 15

5.



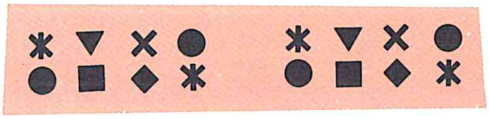
4 fours = 16



8 twos = 16

"Use your markers. Can you separate 16 in even sets of 3?"

6.



2 eights = 16

7. How many boxes have 12 things? 5
Tell all the ways you can count 12.
How many ways can you count 14? 15? 16?

"Can you find a picture to show each way you counted?" (By 1, 2, 3, 4, and 6)

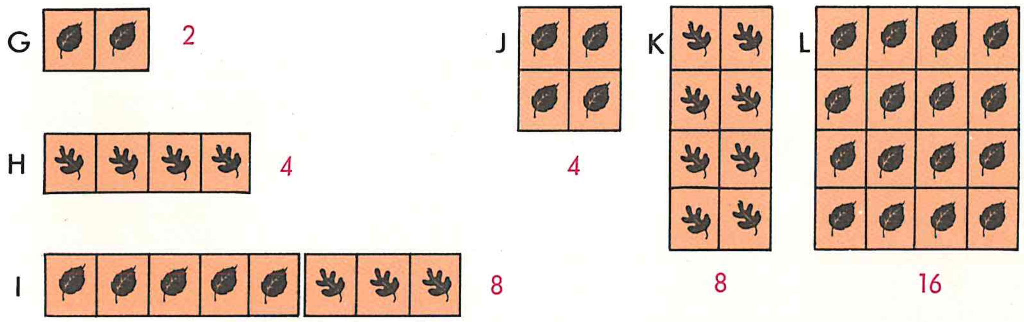
Accept also answers like 3, 6, 12, 13, 14; 5, 10, 15, 16.

FOLLOW-UP: A5, 6, 7 (G106)

(G73) AIMS: Discover relationships between the numbers 2, 4, and 8; 3, 6, and 9; use these relationships in finding answers to facts.
ACTIVITIES: A11, 12; B18a–c (G106)
PROCEDURES: Explore the pictures. Find all the pictures that show 4, 8, 2. Help pupils who need concrete materials use their strips of squared paper.

TWO, FOUR, AND EIGHT

1. How many leaves in each picture?
Write the answers.
Use the pictures to help you.



How many fours in picture J? 1 in K? 2 in L? 4
How many twos in H? 2 in I? 4 "How many 2's in K? in L?"
How many pictures show sets of 8 leaves? I, K, L

2. Write the missing numerals.

Pupils who can work by themselves may write answers for Ex. 2. Use Ex. 2 orally with children who need more help. Have them find pictures to illustrate examples in 2a, and 2b.

a. 2 twos = 4
3 twos = 6
3 twos = 4 + 2

b. 2 fours = 8
4 fours = 16
2 eights = 16

If necessary, have pupils arrange objects to illustrate examples 2a – 2d.

c. 3 fours = 2 sixes
2 fours = 4 twos
2 eights = 4 fours

d. 4 fours = 8 twos
3 fours = 4 threes
2 eights = 8 twos

e.

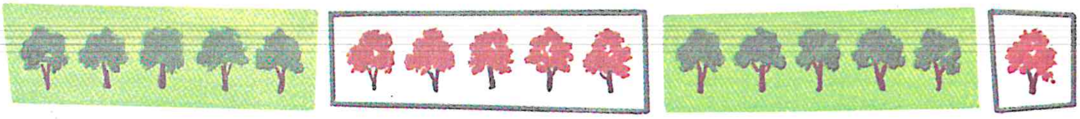
$$\begin{array}{rrrrrrr} 8 & 4 & 16 & 14 & 12 & 13 & 13 \\ +\ 6 & +8 & -\ 8 & -\ 6 & -\ 4 & -\ 6 & -\ 4 \\ \hline 14 & 12 & 8 & 8 & 8 & 7 & 9 \end{array}$$

After oral work ask the rest of the children to write answers to 2e.

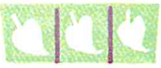
Continue on page 116.

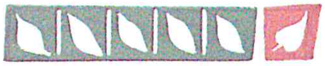
Help pupils explore the picture line and pictures A – F. Guide children in comparing the number of squares in pictures A – F. Which can they count by 3's? (all but C) Which pictures show the same number of objects in different patterns? (B, D)

THREE, SIX, AND NINE



1. On the picture line, show 10, 12, 15, 13, 14.

A

3

B

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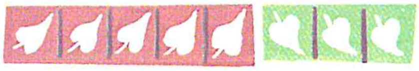
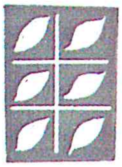
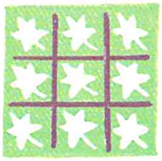
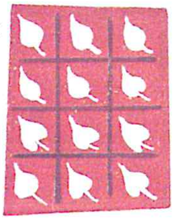
C

8

D

6

E

9

F

12

Tell how many are in each picture above.
How many threes in D? 2 in E? 3 in F? 4
How many sixes are in F? 2

Which picture has the most sets of 3? (F)

You may wish some children to work independently with Ex. 2. Help other pupils to think: 3 threes = 9
3 + 6 = 9 so 3 threes = 3 + 6.

2. Write the missing numerals.
Use the pictures to help you.

a. 3 threes = 3 + 6
4 threes = 3 + 9
5 threes = 9 + 6

b. 2 threes = 3 + 3
4 threes = 6 + 6
5 threes = 12 + 3

c.

$$\begin{array}{r} 3 \\ +6 \\ \hline \boxed{9} \end{array} \qquad \begin{array}{r} 9 \\ +\ \boxed{6} \\ \hline 15 \end{array} \qquad \begin{array}{r} 15 \\ -\ 6 \\ \hline \boxed{9} \end{array} \qquad \begin{array}{r} 9 \\ -\ \boxed{6} \\ \hline 3 \end{array} \qquad \begin{array}{r} 13 \\ -\ 4 \\ \hline \boxed{9} \end{array} \qquad \begin{array}{r} 13 \\ -\ \boxed{6} \\ \hline 7 \end{array} \qquad \begin{array}{r} 12 \\ -\ 9 \\ \hline \boxed{3} \end{array}$$

d. 5 threes = 15
2 threes = 6
3 threes = 9
4 threes = 12

e.

$$\begin{array}{r} 3 \\ 3 \\ 6 \\ \hline \boxed{12} \end{array} \qquad \begin{array}{r} 6 \\ 6 \\ \boxed{3} \\ \hline 15 \end{array} \qquad \begin{array}{r} 3 \\ 3 \\ 3 \\ \hline \boxed{9} \end{array} \qquad \begin{array}{r} 3 \\ 9 \\ 3 \\ \hline \boxed{15} \end{array}$$

FOLLOW-UP: B21 (G112)

(G73–74) AIMS: Learn about feet and inches; develop "greater than," "less than" concept.
ACTIVITIES: Provide opportunities to measure objects.
PROCEDURES: Provide practice in finding points along the ruler. Encourage pupils to use their own rulers or the picture if they need help in finding answers in Ex. 1.

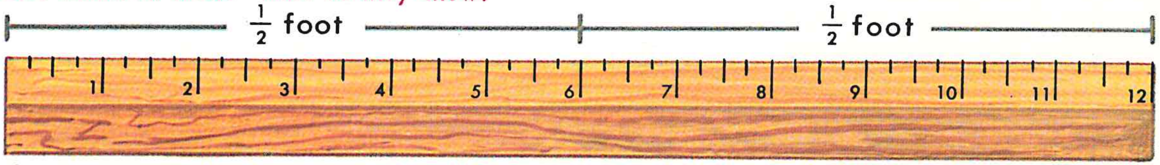
FEET AND INCHES

> means is greater than

$6 < 12$
$12 > 6$

< means is less than

Discuss marks on ruler. "What do they show?"



Develop understanding of the ruler as a kind of number line.

In explaining the symbols encourage pupils to discover that the angle, or point, is always toward the smaller number ($5 > 3$, $2 < 6$). It will help them differentiate.

1. Write the answers. Use your ruler to check.

Question the pupils about comparative size of their rulers and the picture.

11 inches − 4 inches = 7 inches
12 inches − 7 inches = 5 inches
10 inches − 6 inches = 4 inches
11 inches − 8 inches = 3 inches
14 inches = 1 foot + 2 inches
16 inches = 1 foot + 4 inches
15 inches = 1 foot + 3 inches
12 inches = 1 foot + 0 inches

Guide pupils in using the terms "greater than, less than" in answering oral questions.

Give some chalkboard examples before Ex. 2.

2. For ▨ write >, <, or =.

a. 14 inches > 1 foot   8 inches > ½ foot
b. 10 inches < 1 foot   4 inches < ½ foot
c. 12 inches = 1 foot   6 inches = ½ foot

The children may make up stories about combining and separating objects of varying lengths. One book is 6 inches. Another is 5. How long are they together?

3. Measure these with your ruler.

Answers will vary.

pencil ▨ inches   book ▨ inches
chalk ▨ inches   crayon ▨ inches
Was anything you measured longer than 1 foot?

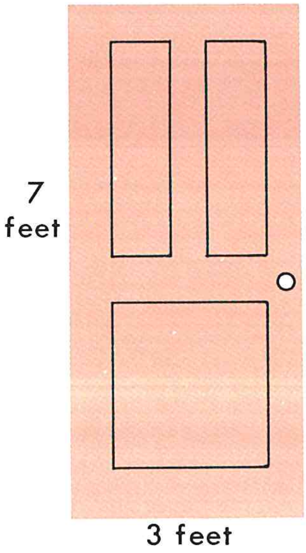
FOLLOW-UP: Extend Ex. 3 with more problems the children make up. See G74.

(G74–75) AIMS: Relate feet and yard; compare measures; learn about equivalent measures.
ACTIVITIES: F 1–6 (G118)
PROCEDURES: Compare classroom measures with those in the pictures. Have pupils test the statement under the picture of the yardstick. Appoint 2 or 3 pupils to do measuring and report to the class.

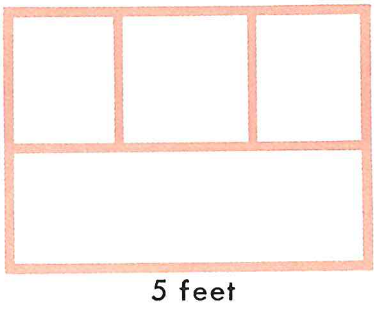
FEET AND YARDS

1 foot = 12 inches

3 feet = 1 yard



Door



Window

Discuss measuring terms: high, height, long, wide, width.

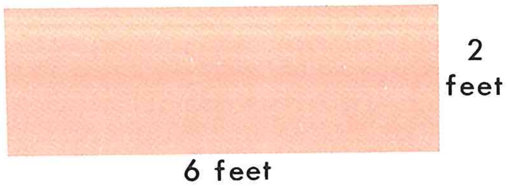


Table Top

Some children will realize that there are several numbers which will make each sentence true in Ex. 2.

How high is the door? How wide is the window? How wide is the table?

Expand the lesson by having them think of a set of three numerals for each sentence.

1. Write >, <, or = for each frame.

Let pupils think of some other comparisons.

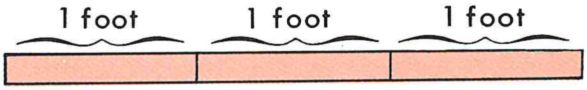
a. 3 feet = 1 yard
b. 7 feet > 1 yard
c. 2 feet < 1 yard
d. 2 yards < 7 feet
e. 6 feet = 2 yards
f. 2 yards > 5 feet

2. Write a numeral to make each sentence true.

Answers will vary.

7 feet > ☐ feet 1, 2, 3, 4, 5, 6
6 feet > ☐ feet 1, 2, 3, 4, 5
2 feet < ☐ feet 3, 4, 5, 6, . . .
5 + 5 < ☐ + 7 4, 5, 6, . . .
7 + 6 > ☐ + 3 9, 8, 7, 6, . . .
3 feet > ☐ feet 0, 1, 2

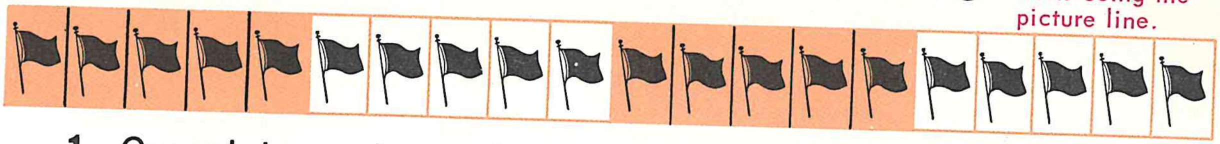
FOLLOW-UP: F1–8 (G118)



3 feet = 1 yard

(G75) AIMS: Understand other names for numbers; practice addition and subtraction.
ACTIVITIES: E1, 2, 3 (G116). Review facts with sums through 16.
PROCEDURES: Give chalkboard exercises to explain procedures for Ex. 1 and 2. Ask children to prove some of their work using the picture line.

PRACTICE WITH NUMBER FACTS



1. Complete each number fact to show the numeral in the box.

See if they can think of other names to put under each numeral.

13	16	15	14
6 + ⑦	7 + ⑨	8 + ⑦	7 + ⑦
4 + ⑨	9 + ⑦	9 + ⑥	5 + ⑨
5 + ⑧	8 + ⑧	7 + ⑧	8 + ⑥
⑥ + 7	④ + 12	⑩ + 5	③ + 11
⑤ + 8	⑥ + 10	⑭ + 1	⑧ + 6

See G75 for extra practice for individuals who are too dependent on pictures.

2. Find the answers.

13 − 4 = 9
13 − 8 = 5
13 − 6 = 7
13 − 5 = 8
14 − 9 = 5
14 − 6 = 8
14 − 5 = 9
14 − 7 = 7

15 − 9 = 6
15 − 8 = 7
15 − 7 = 8
15 − 6 = 9
16 − 7 = 9
16 − 9 = 7
16 − 8 = 8
16 − 10 = 6

Use Ex. 2 again after special practice work but give the examples in a different order.

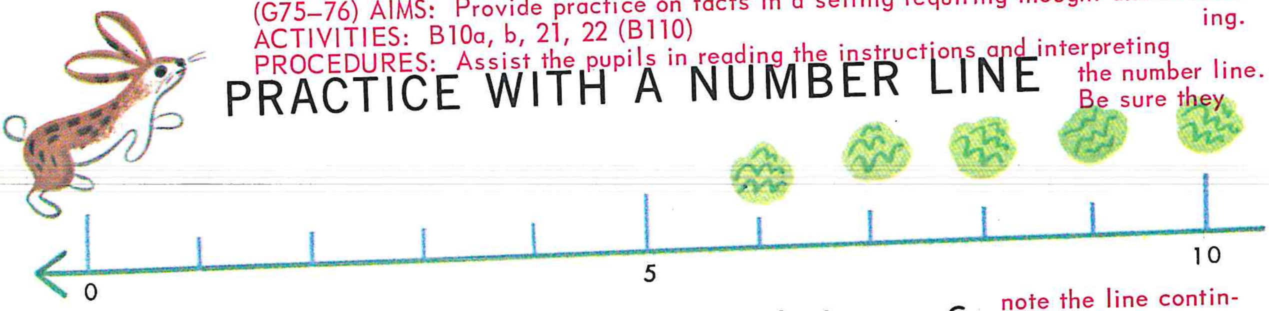
3. Find the answers.

160	164	74	95	136	157	83
− 80	− 81	+62	+12	− 34	− 82	+84
80	83	136	107	102	75	167

OLLOW-UP: Have pupils respond orally as you call the number combinations in Ex. 1.

(G75–76) AIMS: Provide practice on facts in a setting requiring thought and reasoning.
ACTIVITIES: B10a, b, 21, 22 (B110)
PROCEDURES: Assist the pupils in reading the instructions and interpreting the number line. Be sure they note the line continues on the facing page.

PRACTICE WITH A NUMBER LINE



When Hopper lands at 6 or 12, or between 6 and 12, he finds cabbage leaves.
When he lands before 6 or after 12, he finds no food.

Work through Ex. 1 orally with pupils. The thinking ways are shown so children can learn the procedures.

1. Hopper starts at 3. Find 3 on the number line.
He takes 2 jumps by fours. 2 fours = 8
3 + 8 = 11
Where does he land?
Hopper lands at 11.
Does he find food? Yes

In Ex. 2 the columns are explained by their headings. Discuss with children how they will find the answers. They may write number sentences or work along the number line.

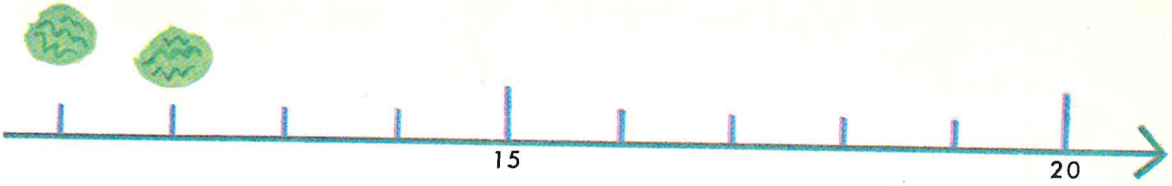
2. Where does he land? Does he find food?

	He starts at:	He jumps by:	Number of jumps:	He lands at:
a.	5	threes	2	11
b.	4	twos	5	14
c.	3	fours	2	11
d.	2	threes	4	14
e.	6	twos	2	10
f.	1	ones	4	5

Have them try both ways. Ask them to show jumps of 3, 4, 2. Are 2 jumps of 3 the same as 1 jump of 6, and so on.

Continue on page 121.

Use Ex. 3 as an oral exercise. Give several children a chance to think of a story and ask the questions. Others may find the answer and determine whether the story fits the stipulation for finding food.



3. Think of a story. Let Hopper get food.
Tell where he starts.
Tell how many jumps he takes.
Think of another story about Hopper.
Do not let him get food.
Tell where he starts.
Tell how many jumps he takes.

Pupils can improvise other situations. Suppose there are carrots at 5 and 6. How can Hopper get to 5 or 6 from various points?

Ask children to show his jumps each time, then help them write a number sentence.

4. Sometimes Hopper jumps to the right.
He can start at 5 and take 7 jumps. 5 + 7 = 12
Sometimes he jumps back to the left.
He can start at 14 and take 5 jumps back.
14 − 5 = 9
Tell about Hopper's jumps.

In a–d, Hopper jumps to the right. In e and f, the last column tells where he lands. The children must find the missing numeral to see how he jumped, and in which direction.

	He starts at:	He jumps:	He lands at:
a.	5	8	13
b.	8	5	13
c.	9	7	16
d.	7	8	15
e.	14	8	6
f.	16	8	8

Did Hopper get cabbage leaves each time?

FOLLOW-UP: E7–10 (G118)

(G76) AIMS: Review of concepts developed in this chapter.
PROCEDURES: In Ex. 1 have pupils write the letters for the items in the list which are equal.

DO YOU REMEMBER?

1. Which are equal? Write the letters.

a. 2 cups h
b. 2 pints j
c. 3 feet g
d. 4 quarts i

e. 6 inches l
f. 1 foot k
g. 1 yard c
h. 1 pint a

i. 1 gallon d
j. 1 quart b
k. 12 inches f
l. $\frac{1}{2}$ foot e

2. Find the answers.

a. 10 + 6 = 16 14 − 7 = 7 14 − 10 = 4
b. 9 + 6 = 15 15 − 7 = 8 14 − 9 = 5

3. Write >, <, or =.

a. 4 + 6 < 3 + 8 **d.** 15 − 6 = 14 − 5
b. 14 − 8 = 13 − 7 **e.** 2 + 8 = 15 − 5
c. 7 + 8 > 5 + 6 **f.** 8 + 4 < 9 + 5

4. Find the answers.

a. $\frac{1}{2}$ pound and $\frac{1}{2}$ pound = 1 pound
b. $\frac{1}{4}$ pound and $\frac{1}{4}$ pound = $\frac{1}{2}$ pound
c. 1 pound = $\frac{4}{4}$ pounds

5. **a.** 5 + 24 = 29 3 + 6 + 5 = 14 15 − 7 = 8
b. 5 + 9 = 14 5 + 8 + 2 = 15 14 − 9 = 5
c. 6 + 7 = 13 2 + 9 + 4 = 15 12 − 5 = 7
d. 4 threes = 12 3 fives = 15 7 twos = 14
e. 2 sixes = 12 3 fours = 12 5 twos = 10
f. 2 sevens = 14 8 twos = 16 4 fours = 16

FOLLOW-UP: Use any activities from this chapter as needed.

(G76) AIMS: Test the children's grasp of the learnings presented in the chapter and recall of concepts taught previously.
PROCEDURES: Set up a test situation which will allow each child to do his best work.

DO YOU KNOW?

1. Find the answers.

$\begin{array}{r} 6 \\ +7 \\ \hline \boxed{13} \end{array}$ $\begin{array}{r} 3 \\ +7 \\ \hline \boxed{10} \end{array}$ $\begin{array}{r} 6 \\ +8 \\ \hline \boxed{14} \end{array}$ $\begin{array}{r} 5 \\ +9 \\ \hline \boxed{14} \end{array}$ $\begin{array}{r} 8 \\ +7 \\ \hline \boxed{15} \end{array}$ $\begin{array}{r} 9 \\ +6 \\ \hline \boxed{15} \end{array}$ $\begin{array}{r} 7 \\ +4 \\ \hline \boxed{11} \end{array}$

2. Find the answers.

$\begin{array}{r} 11 \\ -\ 6 \\ \hline \boxed{5} \end{array}$ $\begin{array}{r} 13 \\ -\ 7 \\ \hline \boxed{6} \end{array}$ $\begin{array}{r} 15 \\ -\ 8 \\ \hline \boxed{7} \end{array}$ $\begin{array}{r} 14 \\ -\ 5 \\ \hline \boxed{9} \end{array}$ $\begin{array}{r} 12 \\ -\ 8 \\ \hline \boxed{4} \end{array}$ $\begin{array}{r} 15 \\ -\ 8 \\ \hline \boxed{7} \end{array}$ $\begin{array}{r} 14 \\ -\ 7 \\ \hline \boxed{7} \end{array}$

3. Write the missing numerals.

a	b	c
$6 + \boxed{7} = 13$	$\boxed{3} + 12 = 15$	$13 - \boxed{4} = 9$
$7 + \boxed{7} = 14$	$\boxed{4} + 10 = 14$	$14 - \boxed{8} = 6$
$5 + \boxed{10} = 15$	$\boxed{10} + 2 = 12$	$11 - \boxed{9} = 2$
$6 + \boxed{6} = 12$	$\boxed{7} + 6 = 13$	$15 - \boxed{6} = 9$
$7 + \boxed{8} = 15$	$\boxed{6} + 8 = 14$	$12 - \boxed{9} = 3$

4. Write the number sentences.
Find the answers.

a. John bought an airplane for 15¢ and a boat for 10¢. How much did he pay for both toys? 25¢

b. Ann had 15¢. She bought a toy dog for 10¢. How much did she have left? 5¢

Continue on page 124.

5. On your paper write >, <, or =.

a. 2 pints < ½ gallon
b. 2 quarts = ½ gallon
c. 3 pints > 1 quart
d. 3 feet = 1 yard
e. 5 feet < 2 yards
f. 1 gallon = 4 quarts

6. Find N.

4 N = 13 − 9
4 N = 12 − 8
4 N = 11 − 7
6 N = 14 − 8
6 N = 12 − 6
6 N = 10 − 4

7. Write the missing numerals.

a

2 threes = 3 + 3
3 fives = 6 + 9
2 fours = 12 − 4
3 threes = 13 − 4
2 fives = 5 twos
7 twos = 2 sevens
3 fours = 8 + 4

b

64 + 3 = 67
37 − 4 = 33
29 − 6 = 23
71 + 8 = 79
53 + 5 = 58
68 − 5 = 63
30 + 6 = 36

Notice whether Ex. 8 shows pupils have a good control of number facts.

8. Make each sentence true in three ways.

a. ■ + ● = 15   ▲ + 5 = ■
b. 14 − ▲ = ●   ■ − ● = 6

Answers will vary.

See G76 for further discussion of Ex. 8.

(G76) AIMS: Use as independent work for individuals unless class is ready for advanced work. PROCEDURES: Give necessary help on reading directions. After individual work, discuss deductions and generalizations about adding and subtracting the same number from pairs.

ENRICHMENT

Does the difference change?

1. Find the difference between:

a. 8, 3 5
b. 7, 5 2
c. 10, 6 4
d. 12, 7 5
e. 11, 3 8

Add 2 to the numbers of each pair. Make a new list of these numbers. Find the differences between the new numbers. Are they the same as before? Yes

10, 5; 5
9, 7; 2
12, 8; 4
14, 9; 5
13, 5; 8

2. Find the difference between:

a. 14, 5 9
b. 15, 9 6
c. 17, 8 9
d. 16, 7 9
e. 18, 9 9

Subtract 5 from the numbers of each pair. Make a new list of these numbers. Find the differences between the new numbers. Are they the same as before? Yes

9, 0; 9
10, 4; 6
12, 3; 9
11, 2; 9
13, 4; 9

3. Write Yes or No.

a. 4 threes > 7 twos No
b. 4 threes > 3 threes Yes
c. 5 twos > 2 twos Yes

4 twos < 2 fives Yes
6 twos < 2 sixes No, same
8 twos < 6 threes Yes

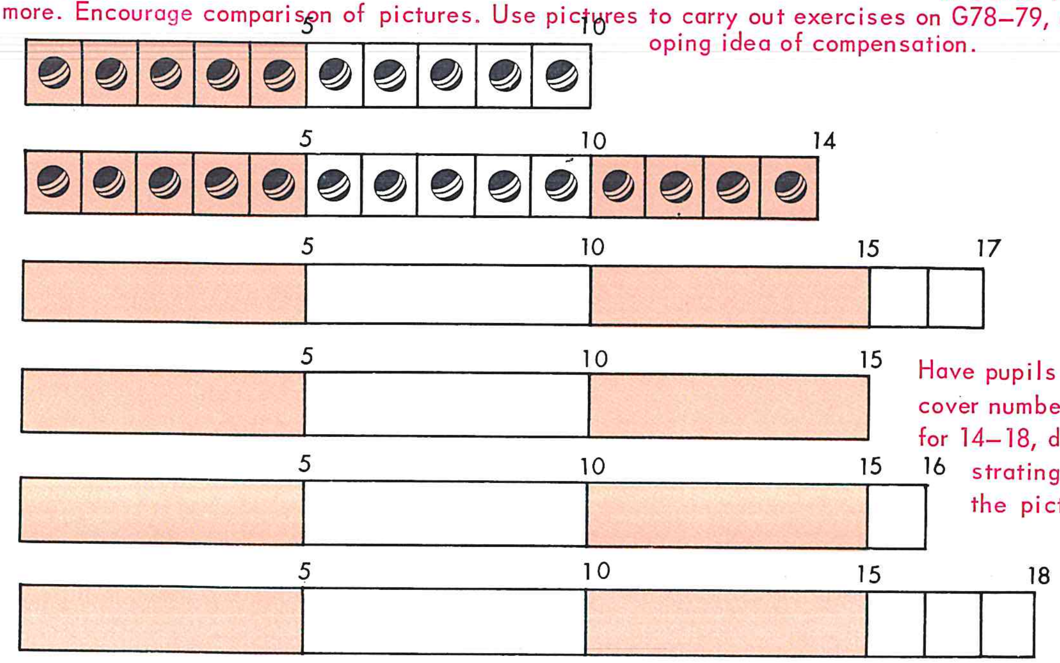
4.

				15
15	**8**	**1**	**6**	
15	**3**	**5**	**7**	
15	**4**	**9**	**2**	
	15	15	15	15

Add the numbers across.
Add the numbers down.
Add the numbers that make an x in the square.
Make a magic square of your own.

(G78–79) AIMS: Learn addition and subtraction facts with sums or minuends of 14–18.
ACTIVITIES: A14, B23 (G107)
PROCEDURES: Have pupils explore the pictures noticing the familiar grouping by 5 in the two top rows. Help the children describe the other rows in terms of 5's or 10 and so many more. Encourage comparison of pictures. Use pictures to carry out exercises on G78–79, developing idea of compensation.

LEARNING ABOUT 17 AND 18



Have pupils discover number facts for 14–18, demonstrating with the pictures.

1. Use the pictures or strips.

Show: 16 = 3 fives and 1 ones   2 fives = 10
16 = 10 and 6 ones
17 = 1 tens + 7 ones   18 = 1 tens + 8 ones

2. Find the answers.

How many other combinations can pupils find for 14? 15? 16? 17? 18? Play a game in which one pupil calls the combination and another gives the answer.

a
17 = 10 + 7
17 = 9 + 8
17 = 8 + 9

b
15 = 6 + 9
15 = 8 + 7
15 = 5 + 10

c
14 = 5 + 9
14 = 8 + 6
14 = 7 + 7

d. 16 = 8 + 8   18 = 9 + 9
e. 16 = 7 + 9   18 = 8 + 10

Continue on page 127.

In Ex. 3 children are to list facts under their proper names. They may use the strips on the opposite page to check their work. Follow a similar procedure for Ex. 4, again using the strips for checking. Exercises may be a written lesson one day and a chalkboard lesson on some other day.

3. Write across your paper:

14 15 16 17 18

In the list below find the names for 14.
Write them under 14 on your paper.
Find the names for 15; for 16; for 17; for 18.
Write them under the numerals.

7 + 8	15	8 + 6	14	6 + 8	14
5 + 9	14	7 + 7	14	9 + 6	15
9 + 8	17	8 + 7	15	10 + 8	18
8 + 8	16	9 + 5	14	10 + 4	14
6 + 9	15	8 + 9	17	10 + 7	17

4. Write across your paper:

5 6 7 8 9

Find the names below for 5, 6, 7, 8, 9.
Write them under the numerals.

14 − 5	9	15 − 7	8	16 − 8	8
15 − 8	7	17 − 8	9	17 − 9	8
15 − 10	5	15 − 9	6	18 − 10	8
16 − 9	7	14 − 8	6	18 − 9	9
14 − 7	7	15 − 6	9	16 − 7	9

5. If 10 + 7 = 17, then 9 + 8 = 17,
and 8 + 9 = 17.
If 10 + 8 = 18, then 9 + 9 = 18,
and 8 + 10 = 18.

Have pupils discover how far they can carry this form of reasoning and what happens as they write the facts.

FOLLOW-UP: B15 (G111)

(G79–80) AIMS: Develop relationship of simple rational numbers; define a whole as two halves, four fourths, three thirds; one half as two fourths.
ACTIVITIES: K1a, b, 2a, b (G123)
PROCEDURES: Discuss the boxes at the top of the page, and the meanings of the fractions. Is $\frac{1}{3}$ always the same size? Why?

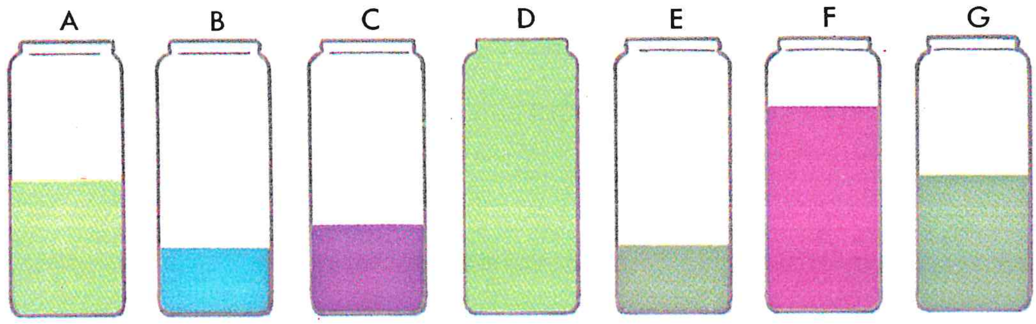
PARTS OF THINGS

$\frac{1}{3}$ means one third

$\frac{1}{3}$ and $\frac{1}{3}$ and $\frac{1}{3} = 1$

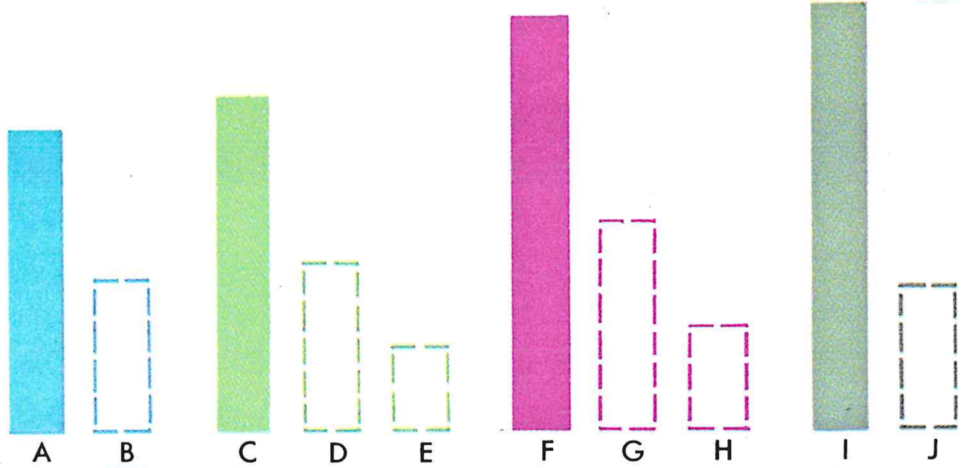
1. Which paint jar is full?
How full is each of the others?
Which jar has just enough to fill A? E?

Try to make each jar full. (See G79)



2. Look at the pictures below.
If A stands for 1, how long is B?
If C stands for 1, how long is D? E?
If I stands for 1, how long is J?
If F stands for 1, how long is H?

In Ex. 2 guide children in studying each set of strips. Compare them. "Could B stand for 1? Then what does A stand for?" (See also G80) Lesson can be extended with some strips of squared paper: "Show 12. Show half of 12. Is a strip of 4 as long as half of 12?"

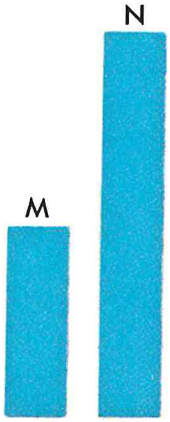


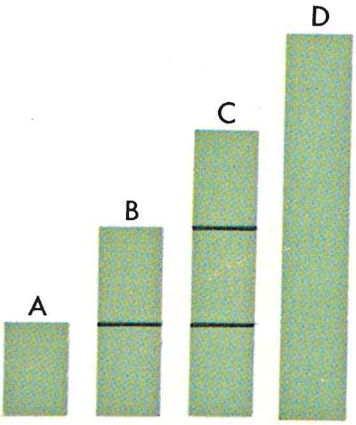
Continue on page 129.

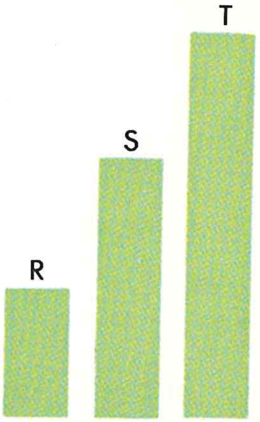
In Ex. 3 guide pupils to find the names of the other units in each set. Discuss how they can use the length of strips they know to help them find the length of the ones they do not know. Stress the concept $\frac{2}{2} = 1$, $\frac{3}{3} = 1$, and so on.

How are N, D, and T alike? (stand for 1)

3. Find the missing numerals.







$M = \frac{1}{2}$

$N = \frac{2}{2} = 1$

$A = \frac{1}{4}$

$B = \frac{2}{4} = \frac{1}{2}$

$C = \frac{3}{4}$

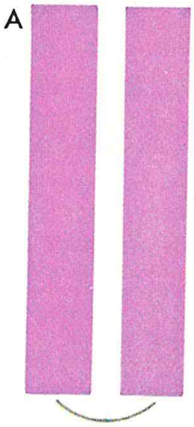
$D = \frac{4}{4} = 1$

$R = \frac{1}{3}$

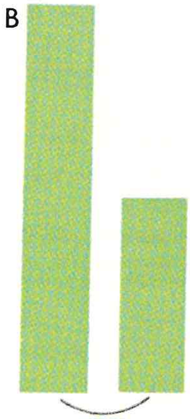
$S = \frac{2}{3}$

$T = \frac{3}{3} = 1$

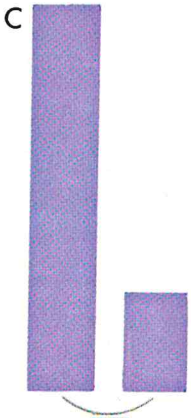
4.



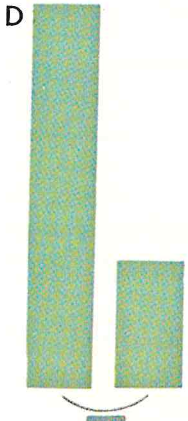
2



d



c



b

Have children match the pictures and number combinations. Give some extra practice on writing the numerals to emphasize relative size.

Which picture shows:

a $1 + 1$

b $1 + \frac{1}{3}$

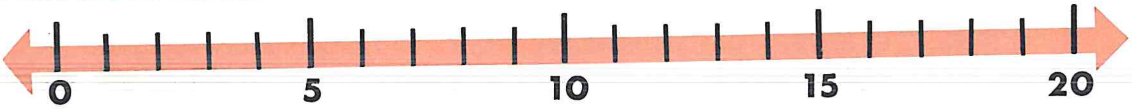
c $1 + \frac{1}{4}$

d $1 + \frac{1}{2}$

FOLLOW-UP: Have children fold and cut some sheets of paper to demonstrate fractional parts. K3–6 (G123)

(G80–81) AIMS: Explore sets of 2–10 using the number line. Look for equal sets; relate several sets of objects representing the same number.
ACTIVITIES: B 3f, 5, 10, 19 (G109)
PROCEDURES: Help pupils set up their papers as shown. Let them prove their answers on the number line.

EQUAL STEPS



1. How many equal steps to 14?

How many twos equal 14?
How many sevens equal 14?

Size of step	Number of steps
2	7
7	2

2. Make a chart like this.

Equal Steps	11	12	13	14	15	16	17	18
2	No	Yes 6	No	Yes 7	No	Yes 8	No	Yes 9
3	No	Yes 4	No	No	Yes 5	No	No	Yes 6
4	No	Yes 3	No	No	No	Yes 4	No	No
5	No	No	No	No	Yes 3	No	No	No
6	No	Yes 2	No	No	No	No	No	Yes 3

Use the number line to work out answers.

Ask pupils to tell why 13, 15, 17 cannot be divided in equal steps by 2. (odd numbers)

Guide them to study their completed chart to gain further odd-even concepts.

Can you go to 11 in 2 equal steps? in 3 equal steps? in 4 equal steps? in 5? in 6? Write the answers on your chart.

(No) See if they can tell why.

In Ex. 3 and 4 guide pupils by using the suggested guide material. (G81)

3. On the number line take 15 baby steps. (one unit at a time)
How far did you go?
15 ones = 15 16 ones = 16 14 ones = 14

4. Take some giant steps on the number line.
1 sixteen = 16 ones 1 fifteen = 15 ones
1 thirteen = 13 ones 1 nine = 9 ones
1 eleven = 11 ones 1 twelve = 12 ones

Help pupils show that they arrive at the same place either way.

FOLLOW-UP: Use more examples of moving along the longer class number line in equal steps. How many steps of 10? 5? 6?

(G81–82) AIMS: Discover the tens and fives multiplication and division facts; relate fives facts and tens facts; use facts less than 5 x 5 to find other answers.
ACTIVITIES: D 1 a–d, 2, 3; B 24a (G114)
PROCEDURES: Guide the class as they explore the 100 chart. Help them realize that the number of fives is always two times the number of tens.

FIVES AND TENS

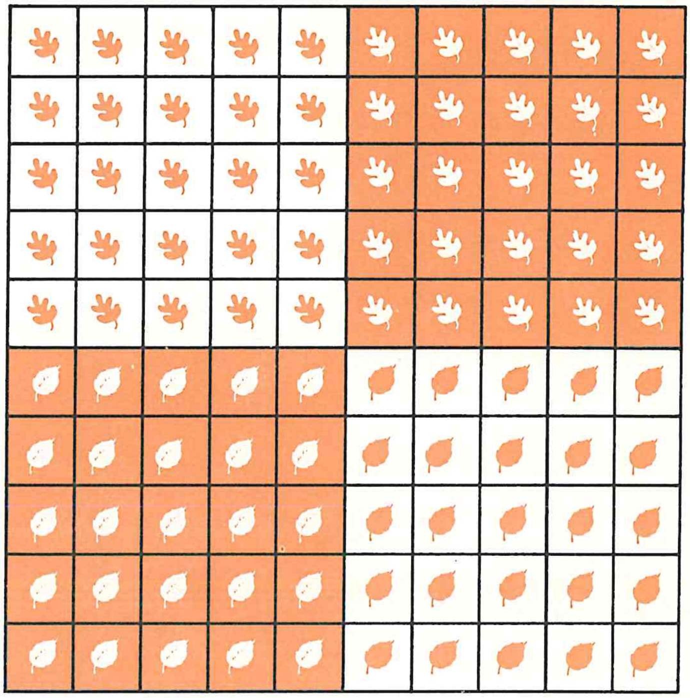
1. How many?

Pupils may use markers to show answers. Develop with pictures, then have class close books and answer orally.

2 tens = 20
4 tens = 40
5 tens = 50
3 tens = 30
1 ten = 10

2 fives = 10
4 fives = 20
5 fives = 25
3 fives = 15
1 five = 5

Pupils should write answers for Ex. 1 and find missing numbers in 2 after class discussion. See also G81–82 for extension of lesson.



2. Write the missing numerals.

Have class compare answers of 5's and 10's.

30 = 3 tens
30 = 6 fives

15 = 3 fives
25 = 5 fives
35 = 7 fives

5 = 1 fives
45 = 9 fives

☐ 5's = △ 10's. Think of several ways to make sentence true.

50 = 5 tens
50 = 10 fives

7 tens = 70
9 tens = 90

20 = 2 tens
20 = 4 fives
6 tens = 60

40 = 4 tens
40 = 8 fives
8 tens = 80

60 = 6 tens
60 = 12 fives
10 tens = 100

Continue on page 132.

Bring out distributive property. The children should write number sentences with frames and complete them by filling the frames with the appropriate numerals.

3. Write the missing numerals.

Help check work in terms of "6 fives = 30 because . . ."

Pupils may show answers on 10 x 10 chart p. 131.

6 fives = 5 fives + 1 five
or 25 + 5 = 30

7 fives = 5 fives + 2 fives
or 25 + 10 = 35

8 fives = 5 fives + 3 fives
or 25 + 15 = 40

8 fives = 4 fives + 4 fives
or 20 + 20 = 40

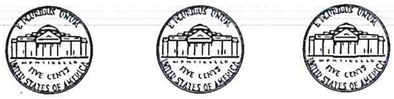
9 fives = 5 fives + 4 fives
or 25 + 20 = 45

9 fives = 10 fives − 1 five
or 50 − 5 = 45

9 fives = 3 fives + 3 fives + 3 fives
or 15 + 15 + 15 = 45

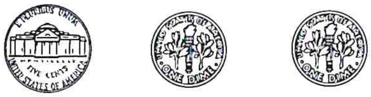
4.

A



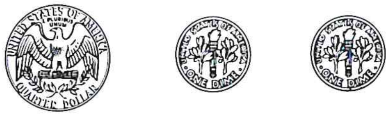
5¢ + 5¢ + 5¢ = 15 ¢

B



5¢ + 10¢ + 10¢ = 25 ¢

C

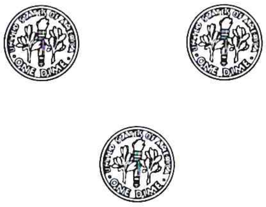


25¢ + 20¢ = 45 ¢

In Ex. 4 discuss the amounts of money and the number sentences. Emphasis may be put on the operations with the money numbers to bring out the distributive property again.

5. Help pupils use what they know of 5 and 10. Use toy nickels and dimes to make up other examples.

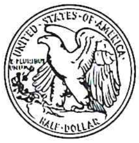
D



30¢ = 10¢ + 20 ¢

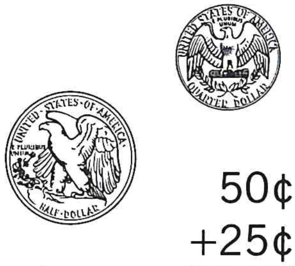
E

50¢ = 20¢ + 30 ¢



50¢ = 10¢ + 40 ¢

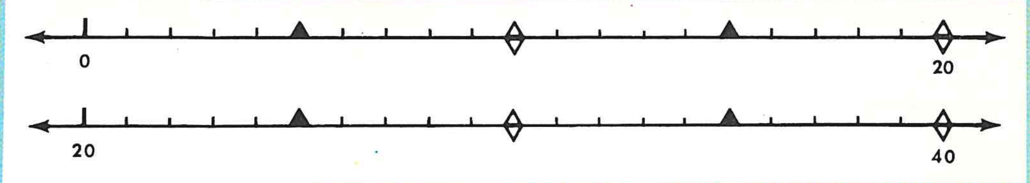
F



$$\begin{array}{r} 50¢ \\ +25¢ \\ \hline 75¢ \end{array}$$

(G82) AIMS: Relate higher decade addition and missing number facts to simple facts.
ACTIVITIES: J 1a, b, 2 a, b (G122)
PROCEDURES: Find various points on the number lines. Compare the lines. How far does each go? What do the triangles and diamonds stand for?

ADDING LARGER NUMBERS



Review some number facts before beginning Ex. 1. Show the answers along the number lines.

Use the number lines.

1. Find 5. Find 10; 15; 35.
Show 3. Show 8 more. 3 + 8 = 3 + 7 + 1 = 11
Show 23. Show 8 more. 23 + 8 = 23 + 7 + 1 = 31

Guide pupils to use markers along number line to find answers. Bring out relationships as they move into higher decades.

2. What are the answers?

Many children will be helped by thinking through the next ten in these steps.

a. 7 + 5 = 7 + 3 + 2 = 12
17 + 5 = 17 + 3 + 2 = 22
27 + 5 = 27 + 3 + 2 = 32

b. 9 + 4 = 13
19 + 4 = 23
29 + 4 = 33

c. 6 + 7 = 6 + 4 + 3 = 13
16 + 7 = 16 + 4 + 3 = 23
26 + 7 = 26 + 4 + 3 = 33

d. 8 + 9 = 17
18 + 9 = 27
28 + 9 = 37

Get pupils to tell how they thought out answers.

3. 5 + 8 = 13 9 + 6 = 15 8 + 7 = 15
35 + 8 = 43 29 + 6 = 35 38 + 7 = 45

Encourage using basic fact and thinking in which decade answers should be.

4.

7	27	9	29	8	28
+7	+ 7	+4	+ 4	+7	+ 7
14	34	13	33	15	35

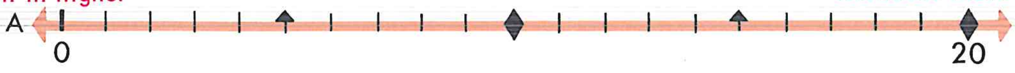
5.

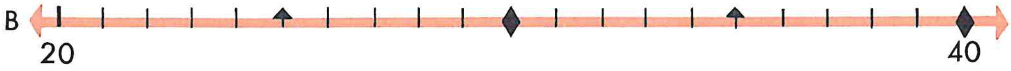
4	34	54	6	16	56
+7	+ 7	+ 7	+5	+ 5	+ 5
11	41	61	11	21	61

FOLLOW-UP: Give work with number facts if pupils hesitate or depend too much on number line. J 4 (G122) addition only.

(G82–83) AIMS: Relate higher decade subtraction to the simple facts in subtraction.
ACTIVITIES: J 1–4 (G122)
PROCEDURES: Review use of the number line and the right to left direction showing subtraction. Guide the children in discovering the use of subtraction facts they know as aids in finding answers for subtraction in higher decades. Note direction of various pupils' thinking, and use chalkboard examples to help each express himself.

USE THE NUMBER LINE





1. Use line A to show 14. Show 14 − 6.
Did you go to the left or to the right?

2. On line B show 34 − 6. What is the answer?

In Ex. 3 children may use the number line, methods developed earlier (see G82), or any efficient method of their own.

3. Find the answers.

If 12 − 4 = 8, then 32 − 4 = 28, and 42 − 4 = 38.
If 13 − 7 = 6, then 33 − 7 = 26, and 43 − 7 = 36.
If 15 − 8 = 7, then 35 − 8 = 27, and 45 − 8 = 37.
If 17 − 9 = 8, then 47 − 9 = 38, and 37 − 9 = 28.
If 16 − 7 = 9, then 46 − 7 = 39, and 36 − 7 = 29.
If 13 − 8 = 5, then 43 − 8 = 35, and 33 − 8 = 25.
If 14 − 6 = 8, then 44 − 6 = 38, and 34 − 6 = 28.

Have pupils share their thinking ways.

Explain the use of charts in Ex. 4. Work through a few orally. Half-inch squared paper will save the children time.

4. Subtract to find the answers for each row.
14 − 9 = 5, 24 − 9 = 15; and so on.

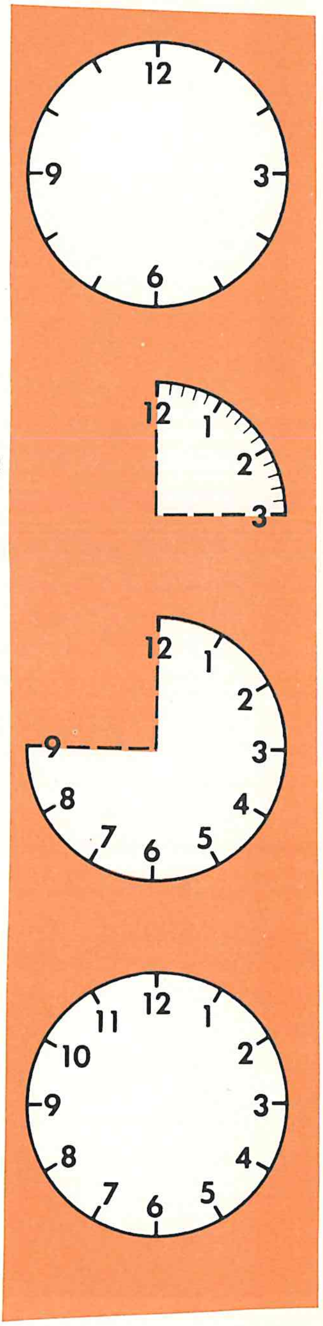
	14	24	34	44	54
9	5	15	25	35	45
6	8	18	28	38	48
8	6	16	26	36	46
7	7	17	27	37	47

	16	56	66	76	86
8	8	48	58	68	78
6	10	50	60	70	80
9	7	47	57	67	77
7	9	49	59	69	79

FOLLOW-UP: Ex. 4 presents an opportunity to develop further the missing addend concept. Explain the term and help pupils use it in talking about number sentences. J 4 (G123)

(G83–84) AIMS: Learn location and order of numerals on the clock face; count by fives.
ACTIVITIES: Preliminary study of classroom clock.
PROCEDURES: Guide pupils in studying the quarters of the clock face in the pictures and in finding numbers of minutes between pairs of numerals. Ask questions to bring out what children already know about the clock.

TELLING TIME BY MINUTES



1. Tell where you find these numerals on the clock face: 12, 6, 9, 3.

2. On a clock what numerals are between:
12 and 3? 6 and 9?
3 and 6? 9 and 12?

Relate quarters of clock to fourths and halves. Children may fold circles of paper and make simple clock faces, putting numerals in the correct quarters. "What shows the minutes?"

3. On a clock what numerals come before and after: 9? 3? 10? 6? 11?

4. How many minutes between:
12 and 1? 12 and 2?
12 and 3? 1 and 2?

Review counting by 5.

5. On the clock count by fives from:
12 to 3; 12 to 6; 12 to 12.

Help class discover there are 4 quarters of 15 minutes each.

6. How many minutes between:
3 and 6? 12 and 4?
12 and 6? 3 and 9?

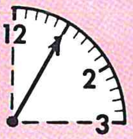
7. How many minutes between:
12 and 7? 7 and 12?

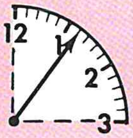
FOLLOW-UP: Use a clock face with movable hands and let each child experiment with setting the hand to show minutes. Let other children suggest moves in multiples of five.

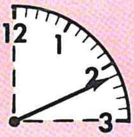
HOW MANY MINUTES?

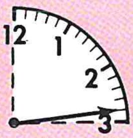
(G84–85) AIMS: Learn the function of the long hand; determine the number of minutes past the hour.
ACTIVITIES: Review counting by 5's.D3a, E4 (G114)
PROCEDURES: Stress reading the number of minutes at any point on the clock face. Use the chalkboard to help class learn to start with an even five, or count by fives if necessary, and then count on or add remaining minutes. Discuss each picture. Give many chances for individuals to read the time shown.

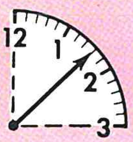
1. The long hand tells how many minutes.
How many?


5 minutes

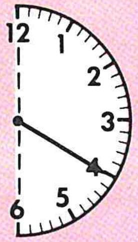

6 minutes

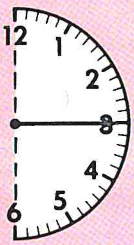

11 minutes


14 minutes


8 minutes

2. Develop understanding that long hand shows number of minutes for each hour. 5 minutes past 12 or 5 minutes past 3, and so on.


20 minutes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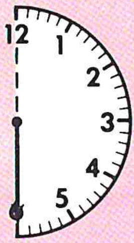
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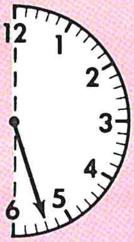
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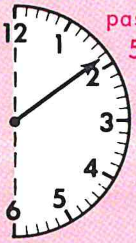
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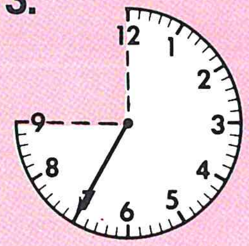
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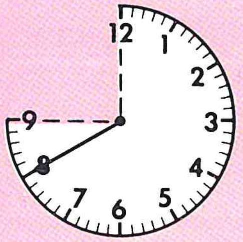
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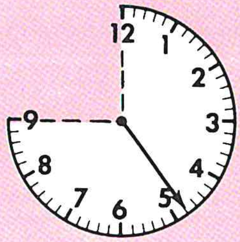
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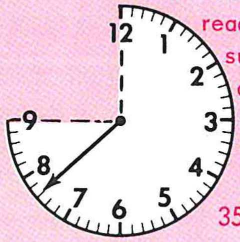
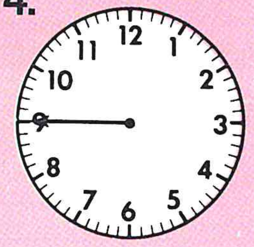

38 minutes

Give help with reading such examples as 35, 36, 37, 38 or 35 + 3 = 38 (G84–85)

4.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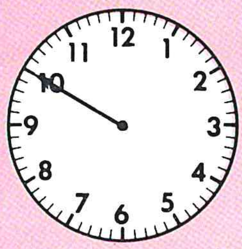
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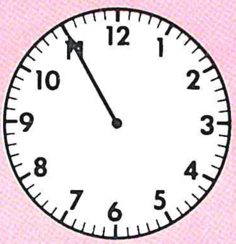
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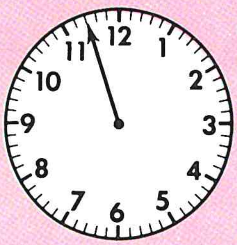

57 minutes

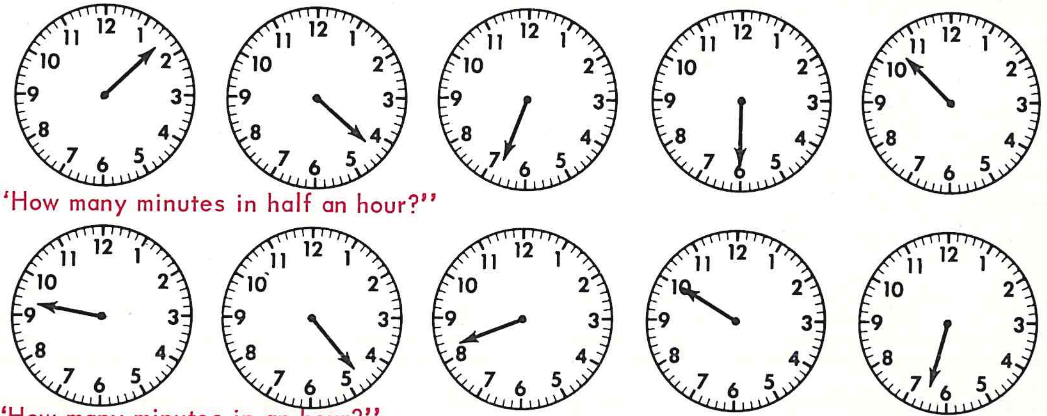
FOLLOW-UP: Use demonstration clock. (See G85)

(G85–86) AIMS: Learn the function of the short hand; tell time by placement of both hands.
ACTIVITIES: Use demonstration clock to review what children have learned.
PROCEDURES: Give many oral experiences in reading time before stressing recording. Chalkboard examples will be most effective to teach recording time. "How many minutes between the 2 and 4? between the 3 and 6?"

WHAT TIME IS IT?

1. The short hand tells the hour.
Tell about what time it is.

Guide pupils to say: "The hand points just after 4; almost at 7; half way between."

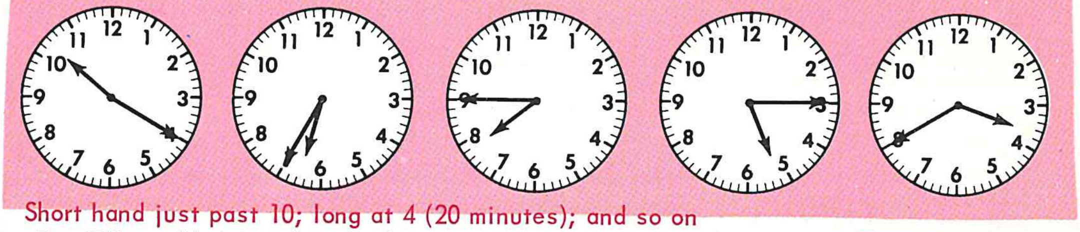


"How many minutes in half an hour?"

"How many minutes in an hour?"

2. Tell where the long hand is. Tell where the short hand is. What time is it?

Discuss time at which the class does various things.

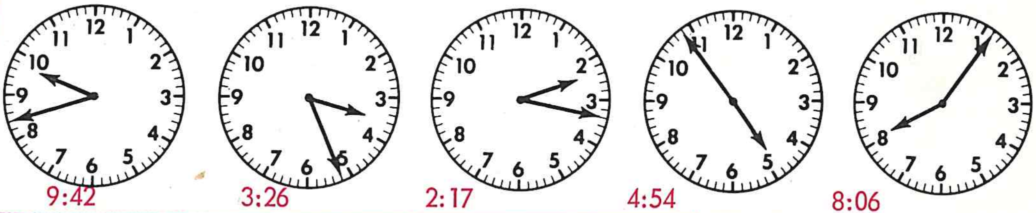


Short hand just past 10; long at 4 (20 minutes); and so on

Before Ex. 3, use examples in G86.

3. The first clock in this row shows 9:42.

Give practice in recording time as you dictate.



9:42 3:26 2:17 4:54 8:06

Write the time each clock shows.

FOLLOW-UP: Adapt previous experiences as needed, using demonstration clock.

(G86) AIMS: Learn to use known facts in addition to find sums in higher decades; relate higher decade addition to tens. ACTIVITIES: Review adding to get 10.
PROCEDURES: Pupils who are sure of their facts may work through this page on their own. You will wish to guide others in using the number lines.

OTHER WAYS TO ADD

1. Find the missing numbers.

5 + 8 = 13 3 + 9 = 12 4 + 9 = 13
7 + 4 = 11 8 + 7 = 15 7 + 7 = 14

Work through Ex. 2 – 4 orally to be sure pupils see the thinking involved. Ask pupils to suggest other examples starting with a basic fact. Put their examples on the chalkboard.

2. What are the answers?

6 + 8 = 14
16 + 8 = 10 + 14 = 24
26 + 8 = 20 + 14 = 34

8 + 9 = 17
18 + 9 = 10 + 17 = 27
28 + 9 = 20 + 17 = 37

3. 7 + 6 = 13
37 + 6 = 30 + 13 = 43
27 + 6 = 20 + 13 = 33

9 + 7 = 16
29 + 7 = 20 + 16 = 36
39 + 7 = 30 + 16 = 46

After oral work, encourage giving answers without all the middle steps.

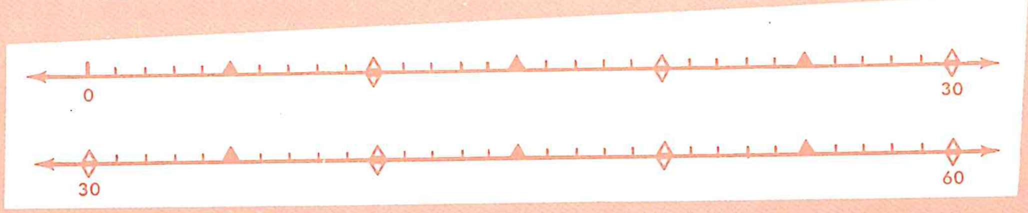
4. 7 + 9 = 16
27 + 9 = 20 + 16 = 36
37 + 9 = 30 + 16 = 46

5 + 9 = 14
25 + 9 = 20 + 14 = 34
35 + 9 = 30 + 14 = 44

Help pupils recognize examples in Ex. 5 as shorter forms which will save time.

5.

27	59	44	26	32	19
+ 4	+ 3	+ 7	+ 7	+ 9	+ 5
31	62	51	33	41	24



FOLLOW-UP: Use any of the activities in Section B 1, 2 (G107).

(G86–87) AIMS: Practice addition, subtraction; review greater than, less than, equal; practice finding a set of numbers smaller than a given number.
PROCEDURES: Use chalkboard reviews of symbols suggested on G86–87. In Ex. 1 have children use each of the signs in turn.

PRACTICE

Write the missing numerals.

1. Complete each sentence to make it true in three ways. For ● use $\{<, =, >\}$.

Other answers will vary

a. $3 + 4 = 2 + 5$ $\qquad 10 - 5 = 1 + 4$

b. $6 + 3 = 1 + 8$ $\qquad 11 - 3 = 2 + 6$

2. 156 = 1 hundreds, 5 tens, 6 ones
179 = 1 hundreds, 7 tens, 9 ones
193 = 1 hundreds, 9 tens, 3 ones

Extend with other examples as needed.

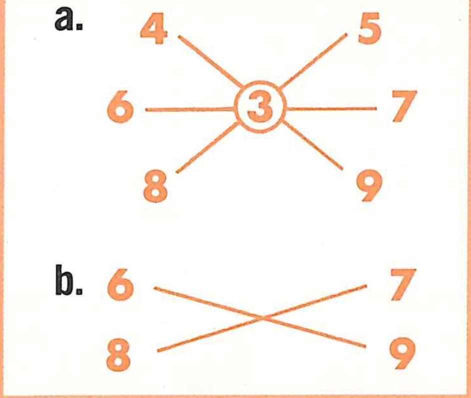
Review orally types of examples in Exercises 3 – 5 or use as written work.

3. Find N.

a. $10 - 10 = 6 - N$ 6 $\qquad$ **b.** $4 - 4 = 8 - N$ 8
$0 + 6 = 12 - N$ 6 $\qquad 7 - N_0 = 0 + 7$

4. Follow the lines. Add the numbers.

As work is checked, see if pupils can explain why answers in a and b are alike.



4	5	7	9	8	6
3	3	3	3	3	3
9	8	6	4	5	7
16	16	16	16	16	16

$6 + 9 = 15$ $\qquad 9 + 6 = 15$
$7 + 8 = 15$ $\qquad 8 + 7 = 15$

5. How many pounds?
20 pounds + 30 pounds = 50 pounds
60 pounds + 11 pounds = 71 pounds
70 pounds + 21 pounds = 91 pounds

FOLLOW-UP: Watch for individual weaknesses and plan additional work for pupils. Other pupils may try to make number designs like 4 a and b.

(G87) AIMS: Decide what the problem tells; determine what the problem asks; write number sentences for problems; find answers; tell what the answers mean.
PROCEDURES: Give help with instructions. Develop any new words. Encourage silent reading and follow with discussion.

WHAT DOES THE PROBLEM TELL?

1. Read the problem. What does it tell you?

Mark has 2 airplanes,
3 boats, and 5 cars.
How many toys has he? 10

Does the problem tell:
how many toys Mark has? No
how many airplanes? Yes
how many boats? Yes
how many cars? Yes

Have children describe the situation in their own words. Each problem has only one illustration. What else might each picture show?

2. Read the problem. What does it tell you?

Betty has 5 dresses
for her big doll.
She has 3 dresses
for her little doll.
Which doll has more
dresses? big doll

Does the problem tell:
which doll has more dresses? No
how many dolls? No
how many dresses in all? No
how many dresses each doll has? Yes

Ex. 3. Children will need to reread Ex. 1 and 2. Discuss the children's number sentences to see if they tell the whole story.

3. Write a number sentence for each problem.
Find the answer. Tell what it means.

FOLLOW-UP: Use the pictures on the page and let pupils develop other problems for them.

(G87–88) AIMS: Determine what the problem asks; decide what the problem tells; write number sentences, find answers and interpret the answers.
PROCEDURES: Have pupils read problems silently. Work separately with any children who have reading difficulties.

WHAT DOES THE PROBLEM ASK?

1. John put 4 pencils in each box.
How many pencils did he put in 3 boxes?

Let pupils reread problems before they discuss the questions.
Encourage children to tell why they chose their answers.

Does the problem ask:

how many pencils in 1 box? Yes
how many pencils in 2 boxes?
how many pencils in 3 boxes?

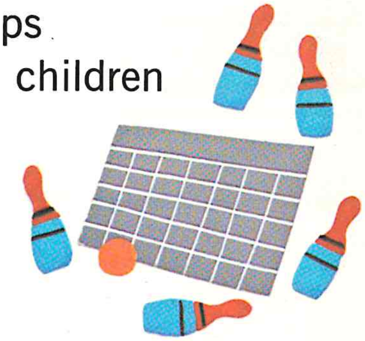
Develop each problem the same way.

2. We have 5 chairs. We need 14 chairs.
How many more chairs must we get?

Does the problem ask:

how many chairs in the room? Yes
how many more chairs are needed?
how many are 5 chairs and 14 chairs?

3. Fifteen children want to make 3 groups the same size for a game. How many children will be in each group?



Does the problem ask:

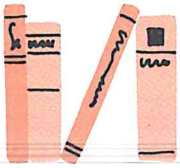
how many groups of 3?
how many children in a group?
how many children are playing? Yes

4. Write a number sentence for each problem.

Let several pupils write their sentences on the chalkboard. See if other children agree. Encourage different ways of arriving at answers. (Ex. 1. 4 + 4 + 4, or 3 fours, or 4 + 4 = 8, 8 + 4 = 12, and so on.)

(G88) AIMS: Write number sentences for problem situations; investigate problem solving techniques.

PROCEDURES: Develop as two preceding lessons suggest.



PROBLEM SOLVING

Give help with new words. Discuss information given or information needed. Pupils may use pictures to show part of the problem.

1. There are 15 books on the shelf. Six books are about pets. The rest are about other animals.

a. 6 + 5 = 11
b. 6 + 9 = 15
c. 15 − 6 = 9
d. 15 − 10 = 5

See G88 for extension of concepts.

Find 2 number sentences at the right to go with the story. b and c

2. Mrs. Bell made 12 cups of lemonade.
The children drank 7 cups.
How many cups were left? Was there a quart left? Yes

Find a number sentence below to tell about the lemonade.

12 + 7 = 19
12 − 7 = 5
10 + 2 = 12
2 + 10 = 12

3. Read each story. Think about what it tells you. Ask a question. Find the answer.

a. Bobby said, "This board is 5 feet long. I have to cut off 12 inches."

b. Joe bought 5 pints of paint. Two pints make a quart.

Review number of inches in foot; number of feet in yard; pints in quart.

Be sure children know what each answer represents.

FOLLOW-UP: Have children make up number stories and draw pictures to illustrate them.

(G88–89) AIMS: Review rational numbers; telling time; higher decade addition and subtraction.
PROCEDURES: Discuss pictures and concepts in Ex. 1 and 2 before using as written lesson. You may wish to use more chalkboard illustrations showing parts of a whole.

DO YOU REMEMBER?

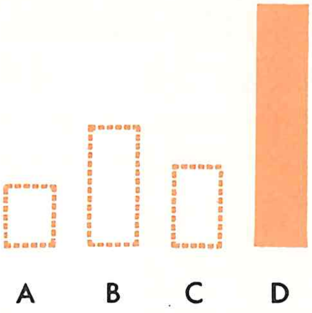
1. If D stands for 1, which picture shows $\frac{1}{2}$? B

Which picture shows $\frac{1}{4}$? A

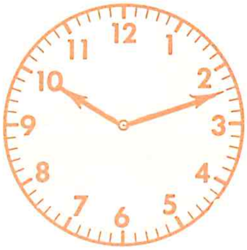
Which picture shows $\frac{1}{3}$? C

Which picture shows $\frac{2}{4}$? B

$\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$ $\quad \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1$



2. Write the time each picture shows.

10:12


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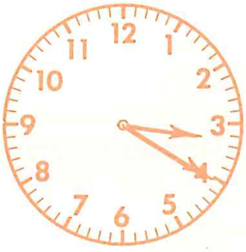

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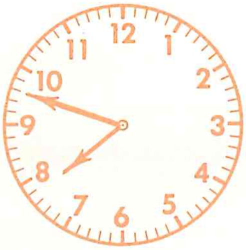

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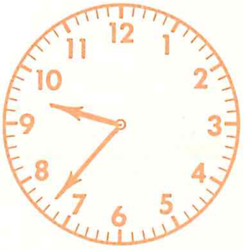


3. Find the answers.

a. 7 + 7 = 14 $\quad$ 8 + 8 = 16 $\quad$ 9 + 9 = 18

b. 7 + 8 = 15 $\quad$ 8 + 9 = 17 $\quad$ 9 + 7 = 16

c. 7 + 10 = 17 $\quad$ 8 + 10 = 18 $\quad$ 6 + 9 = 15

4. Find the answers.

8 + 4 = 12, 28 + 4 = 32, 48 + 4 = 52

If 12 − 8 = 4, then 22 − 8 = 14, and 42 − 8 = 34.

If 11 − 2 = 9, then 31 − 2 = 29, and 51 − 2 = 49.

23	51	75	63	99	87	80
+46	+60	+32	−20	−44	−47	+70
69	111	107	43	55	40	150

FOLLOW-UP: Use any suitable activities from the sections beginning on G105. Plan work for small groups as needed.

(G89) AIMS: Test mastery of number facts; understanding of higher decade in addition and subtraction. PROCEDURES: Set up a test situation that will give each child an opportunity to do his best work on these pages. Watch pupils as they work and keep some individual records.

DO YOU KNOW?

Find the answers.

1. **a.**

14	16	15	16	14	15	13
− 7	− 7	− 8	− 8	− 9	− 5	−10
7	9	7	8	5	10	3

b.

8	10	7	6	12	11	11
+6	+ 6	+ 8	+9	+ 4	+2	+ 4
14	16	15	15	16	13	15

2. Find how many sets.

12 = 6 twos

12 = 4 threes

3 fours = 12

12 = 2 sixes

14 = 2 sevens

14 = 7 twos

14 ones = 14

16 = 2 eights

16 = 8 twos

8 twos = 16

3. 3 fives = 15

7 fives = 35

9 fives = 45

3 tens = 30

6 tens = 60

1 ten = 10

4. 21 + 7 = 28

35 + 4 = 39

67 − 4 = 63

5.

42	27	85	77	60	150	147
+15	+52	−31	+22	+60	− 70	− 63
57	79	54	99	120	80	84

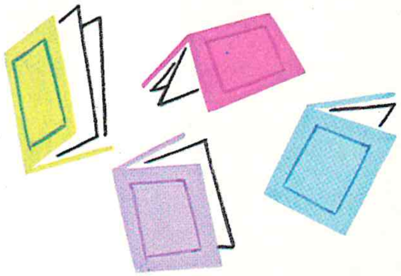
Continue on page 145.

Problem test may be given separately. Discuss instructions. Most pupils will have no difficulty with the reading. Make special provision for children who do need reading help.

Read each problem.
Write a number sentence for it.
Find the answer.

Accept any correct number sentences.

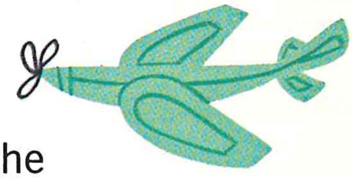
Be sure children give both the answer and the number sentence.



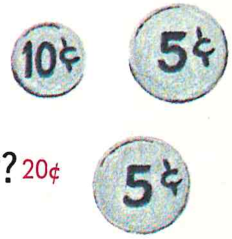
6. Carol had 11 toy animals.
She gave away 3 of them.
How many animals are left? 8
11 − 3 = 8, 3 + 8 = 11

7. Mary had 9 picture books.
Father bought her 4 more.
How many are 9 books and 4 books? 13
9 + 4 = 13

8. Susan found 12 pictures of pets.
She used 9 of the pictures.
Are there some pictures left? Yes
12 − 9 = 3, 9 + 3 = 12



9. A toy airplane costs 30¢.
Tom has 25¢.
How much more does he need to buy the airplane? 5¢ 30 − 25 = 5. 30¢ − 25¢ = 5¢, etc.



10. Bill has 10¢. Joe has 5¢. Mary has 5¢. How much money have they altogether? 20¢
10 + 5 + 5 = 20, or any other correct representation.

FOLLOW-UP: Use activities as indicated by test results. (G105)

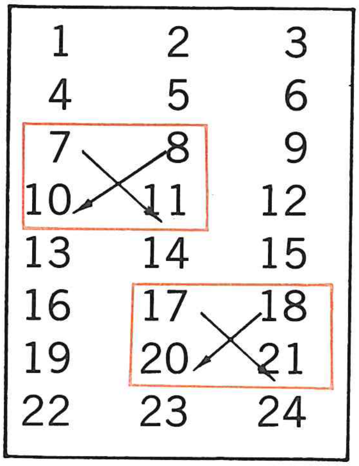
(G89–90) AIMS: Practice addition and subtraction; discover number patterns.
PROCEDURES: Use for individual independent work or class discussion. Call attention to the arrangement of tables by twos, by threes, or by fours. Let children discover the addition pattern. Have them box several sets in each table.

ENRICHMENT

Find the surprise.

1. Make a table of threes. Put a box like this → around any four numerals. Follow the arrows. Add the numbers. What do you find?

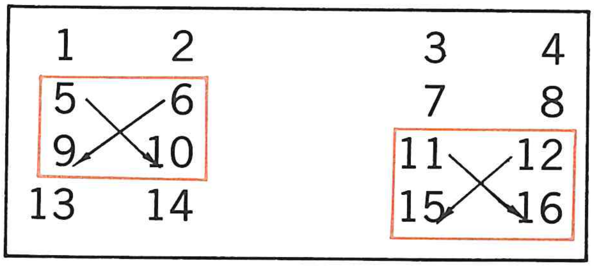
7 + 11 = 18
8 + 10 = 18



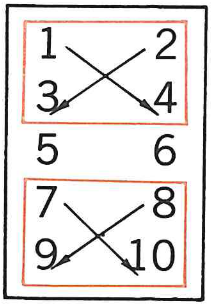
1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18
19	20	21
22	23	24

Children may experiment with all the combinations they can think of. Give some guidance if the addition gets too difficult. Help pupils discover ways to arrive at answers beyond their present skills, counting, thinking through ten, adding tens and counting on ones, and so on.

2. Would it work the same way if you set up a table by fours? by twos? by tens? Try it.



1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16



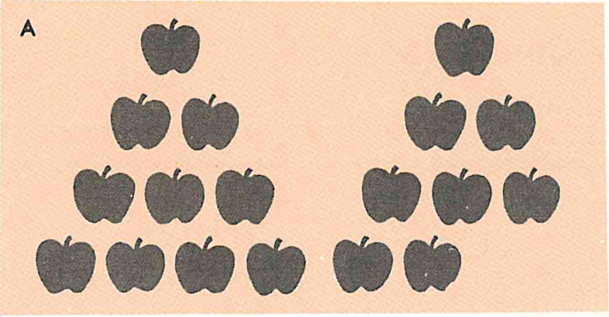
1	2
3	4
5	6
7	8
9	10

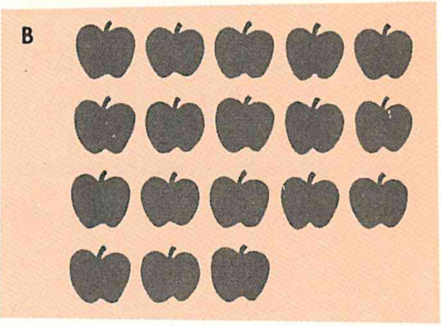
See G89 for other suggestions.

3. Can you use this idea to find some other interesting things on your own?

(G91–92) AIMS: Review addition and subtraction facts with sums or minuends of 14 – 18.
ACTIVITIES: Adapt activities on G106 to facts with sums through 18.
PROCEDURES: Determine the number of objects in A and B. In Ex. 2 allow pupils who need them to use the pictures.

USING SETS AND NUMBER FACTS





1. How many apples in picture A? 18
How many in picture B? 18

Have pupils tell how they see them. (5's, 10 and so many more, etc.) Encourage discussion of other names for numbers. Extend by putting 14 and 15 on the chalkboard and having the class think of names to list under each.

2. Write the missing numerals.

18	
6	12
10	8
7	11
9	9
15	3
13	5

17	
8	9
2	15
7	10
8	9
6	11
5	12

16	
6	10
8	8
7	9
4	12
9	7
13	3

See if most pupils can give answers without using pictures.

3. Write the missing numerals.

a

6 + 8 = 14
8 + 8 = 16
9 + 8 = 17
7 + 8 = 15
9 + 9 = 18

b

16 – 6 = 10
18 – 9 = 9
16 – 8 = 8
17 – 9 = 8
15 – 6 = 9

Review using doubles to help find answers. "Which of these are doubles?" (8 + 8, 9 + 9, 16 – 8, 18 – 9)

Continue on page 148.

In Ex. 4, be sure children understand the use of like frames. In Ex. 4, the frames are the same, in Ex. 5 they differ. Ex. 6 gives the children a set of numbers to use in the diamond. Use two or three chalkboard exercises to demonstrate that each example in Ex. 6 must be written 5 times.

Make the number sentences true.

For each sentence:

If the frames are the same shape,
use the same number for each.
If the frames are different,
use different numbers for each.

Write the missing numerals.

4. a. ▲7 + ▲7 = 14
■8 + ■8 = 16
◆9 + ◆9 = 18

b. ■5 + ■5 + ■5 = 15
◆4 + ◆4 + ◆4 = 16 12
▲6 + ▲6 + ▲6 = 18

Answers will vary. Unlike frames in a number sentence may hold like numerals but guide children to use a variety of combinations.

5. a. 14 = ■ + ▲
16 = ■ + ▲
15 = ■ + ▲

b. 18 = ■ + ▲
17 = ■ + ▲

6. Subtract each number in the set.
For ◆ use {6, 9, 5, 8, 7}.

a. 15 − ◆6 = ■9 15 − ◆9 = ■6 15 − ◆5 = ■10
15 − ◆8 = ■7 15 − ◆7 = ■8

Do b and c the same way.

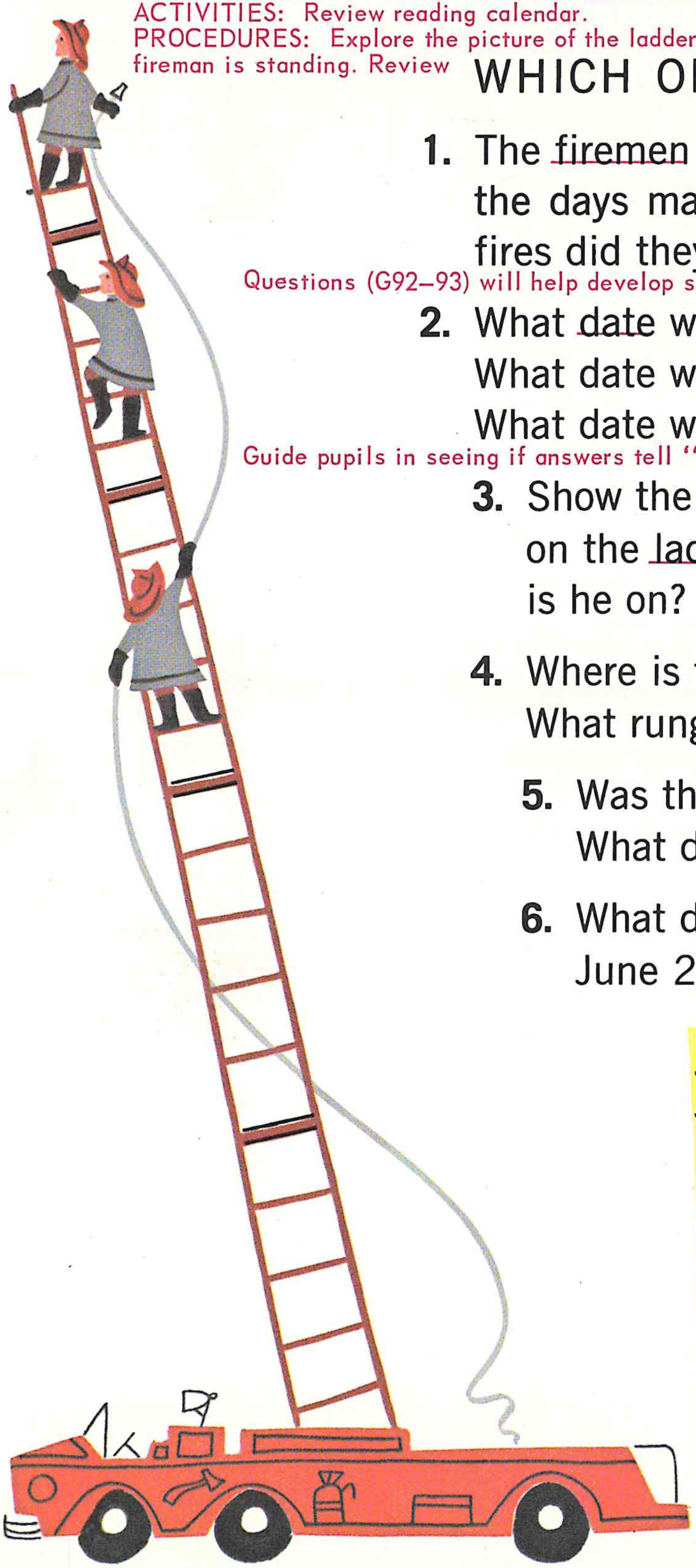
Checking answers will be simplified by doing b and c at the chalkboard. See also G92 for written answer form.

b. 18 − ◆ = ■
16 − ◆ = ■

c. 14 − ◆ = ■
17 − ◆ = ■

FOLLOW-UP: Use more chalkboard examples with missing addends for number facts 11–18.

(G92–93) AIMS: Differentiate between cardinal and ordinal concepts of numbers.
ACTIVITIES: Review reading calendar.
PROCEDURES: Explore the picture of the ladder; discuss number of rungs and where each fireman is standing. Review days and weeks on calendar.



WHICH ONE?

1. The firemen went to fires on all the days marked ○ . How many fires did they go to in June? 14

Questions (G92–93) will help develop skill in using calendar.

2. What date was the first fire? fifth
What date was the third fire? ninth
What date was the last fire? thirtieth

Guide pupils in seeing if answers tell "how many" or "which one." Explain day 23 or rung 21 as ordinal use.

3. Show the second fireman on the ladder. What rung is he on? sixteenth

4. Where is the top fireman? twenty-first
What rung is just below him? twentieth

5. Was there a fire on the tenth? no
What date is one week later? seventeenth

6. What days are between June 22 and June 25? twenty-third twenty-fourth

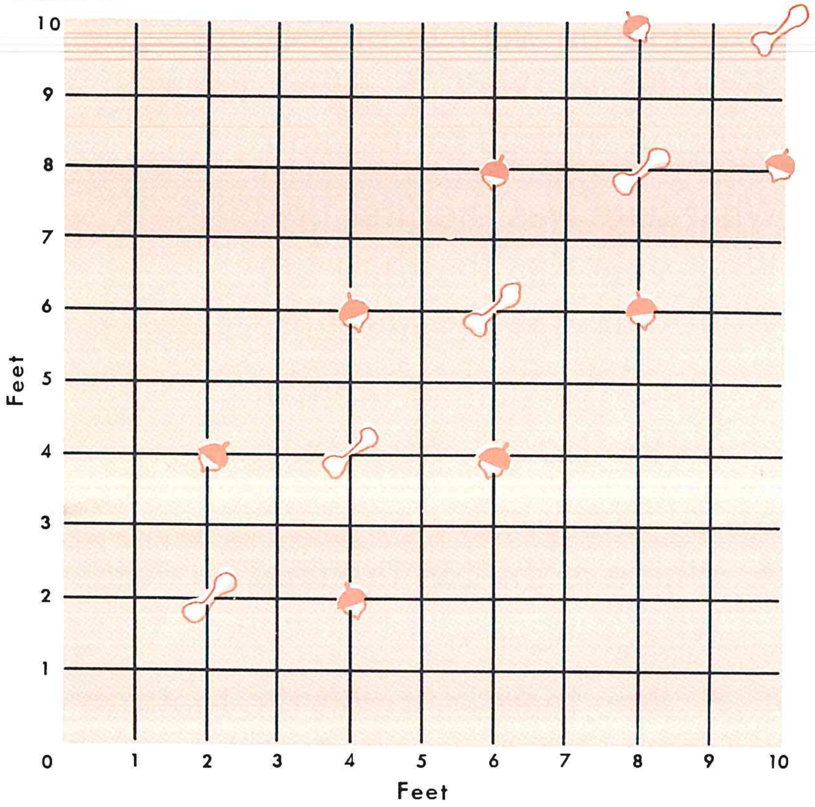
JUNE

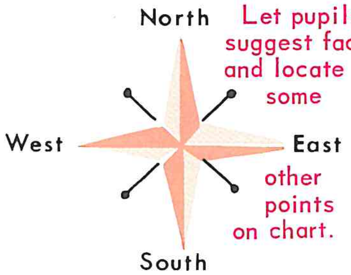
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
	1	2	3	4	⑤	6
7	⑧	⑨	10	11	⑫	⑬
14	⑮	16	⑰	⑱	19	⑳
㉑	22	㉓	24	㉕	㉖	27
28	29	㉚				

FOLLOW-UP: Use school events to strengthen understanding of the cardinal and ordinal concepts.

(G93) AIMS: Locate points by moving east and north on a chart.
ACTIVITIES: A10; B 1, 2; D12 (G106)
PROCEDURES: Review understanding of north and east. Explore chart. Work through several examples, then call attention to pattern and number facts. "Can anyone explain why bones make the pattern?" (facts are all doubles, or he went same distance north and east.)

HOW MANY FEET EAST AND NORTH?





Let pupils suggest facts and locate some other points on chart.

1. The chart shows where Blackie hid bones. He went east and north each time. How far north? How many feet altogether?

East	2	4	6	8	10
North	2	4	6	8	10

2. Frisky hid two sets of acorns. Tell how far east and north he went each time.

East	4	6	8	8	10
North	2	4	6	10	8

East	2	4	6		
North	4	6	8		

How many feet did he go altogether each time?

FOLLOW-UP: Provide pupils with a 10 x 10 block of squared paper for exercises suggested on G93.

(G94) AIMS: Study sequence of numbers, 100 – 200; recognize patterns in series of numerals.
ACTIVITIES: B2c; D1–5 (G109)
PROCEDURES: Use some chalkboard illustrations reviewing ascending and descending patterns, 2's, 5's, 10's. Give some practice on reading and writing numerals.

NUMERALS AND NUMBER WORDS

stands for one hundred

1. Write the numerals that come next.

101 103 105 107 109 111 113
100 102 104 106 108 110 112
114 115 116 117 118 119 120
156 155 154 153 152 151 150
100 110 120 130 140 150 160
145 140 135 130 125 120 115

Ex. 2. Develop new symbol and review hand pictures for 5 and 10. Put the 3 symbols on the chalkboard and extend exercise with oral examples for pupils to write on chalkboard.

2. Write the numerals. Stress hundreds, tens, ones in each example.

a.	one	three	five	135
	one	six	zero	160
	one	seven	one	171
	one	four	seven	147

b.	one	eight	one	181
	one	two	four	124
	one	one	six	116
	two	zero	zero	200

See how quickly pupils recognize the two combinations that name 130.

3. Write the numeral for:

one hundred
six tens
zero ones
= 160

eight tens
two ones
= 82

Let pupils suggest scrambled combinations while others write the numerals.

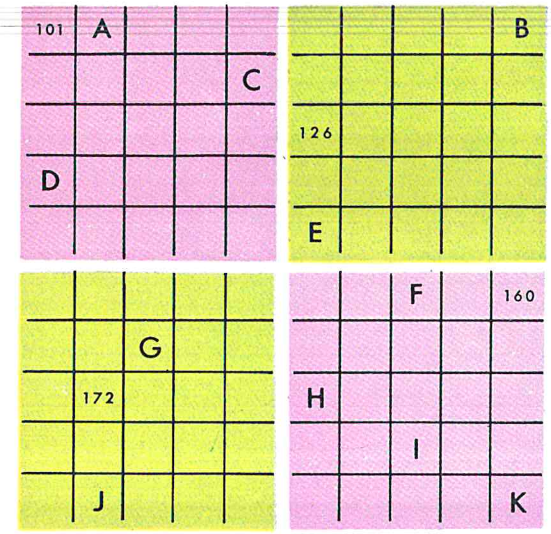
three tens
zero ones
one hundred
= 130

one hundred
zero ones
three tens
= 130

FOLLOW-UP: See Section D1–11 (G114).

(G94–95) AIMS: Extend numeration system through 200; understand hundreds, tens, and ones; read and write numerals
ACTIVITIES: D9, 11, 14–19 (G115)
PROCEDURES: Review orally the pupils' understanding of place value. Compare this chart (101 – 200) with the 1 – 100 chart they have used earlier. See also suggested exercises (G95) for using two 10 x 10 charts.

FROM 100 to 200



1. A stands for 102.
K stands for 200.
Write numerals for these letters:

B	G
C	H
D	I
E	J
F	

Have class read and interpret numerals. Ask how many hundreds, tens, and ones in each.

2. Show the square for each number.

Review also expanded form:
100 + 30 + 3

Hundreds	Tens	Ones
1	6	0
1	0	8
1	1	7

Hundreds	Tens	Ones
1	3	3
1	5	0
1	1	1

Guide children to think each part in its proper order and find the appropriate square.

3. Write the numerals. Show the square for each number.

0 ones, 6 tens, 1 hundred 160
2 ones, 8 tens, 1 hundred 182
1 hundred, 5 tens, 9 ones 159
1 hundred, 3 ones, 0 tens 103
9 tens, 9 ones, 1 hundred 199

Continue on page 153.

Classroom charts for 1 – 100 and 101 – 200 will be helpful in working with this page. Use many chalkboard examples to develop understanding. Help pupils with thinking ways. 140 + 10 + Δ. See suggestions G95.

4. Find the missing numeral.

a. 153 = 140 + 13
140 = 130 + 10
161 = 150 + 11
135 = 120 + 15
174 = 160 + 14

b. 180 = 170 + 10
192 = 180 + 12
117 = 100 + 17
123 = 110 + 13
136 = 20 + 16

Use knowledge of adding tens.

Develop as a game with rules for moving right, left, up, or down. Ask pupils to study arrows and decide on the moves. Direction, not color, of arrows is what pupils must watch.

5. Use the chart. Remember:
→ means move one square to the right.
← means move one square to the left.
↓ means add 10.
↑ means subtract 10.
What is the number?

a. 120 ↓ ↓ ↓ = 150
131 → → → ↓ ↓ = 154
145 → → → ↑ ↑ = 128
138 ↓ ↓ ← ← = 156
106 ↓ ↓ ↓ ← ← = 134

b. 102 → → → → = 106
199 ↑ ↑ ↑ ↑ = 159
180 ↑ ↑ → → → = 163
104 ← ← ← = 101
170 ← ← ↑ ↑ ↑ = 138

Help pupils with reading and writing of numerals. Answers will vary.

6. Write three numerals that have:

a. 8 in tens' place
b. 0 in ones' place
c. 3 in tens' place
d. 4 in ones' place
e. 8 in ones' place
f. 6 in tens' place

7. 133 = 120 + 13   154 = 140 + 14   110 = 100 + 10

FOLLOW-UP: For pupils who need it, review games of Hopper. (text pp. 46, 47, 51)

(G95–96) AIMS: Identify a number of squares with the appropriate numeral; compare two numbers.
ACTIVITIES: C1, 2, 3, 4 (G113)
PROCEDURES: Explore grouping of squares in picture counting the fives and adding the ones. Call attention to the numerals in the triangle and guide pupils in matching. First match in order of numerals. Later vary the order.

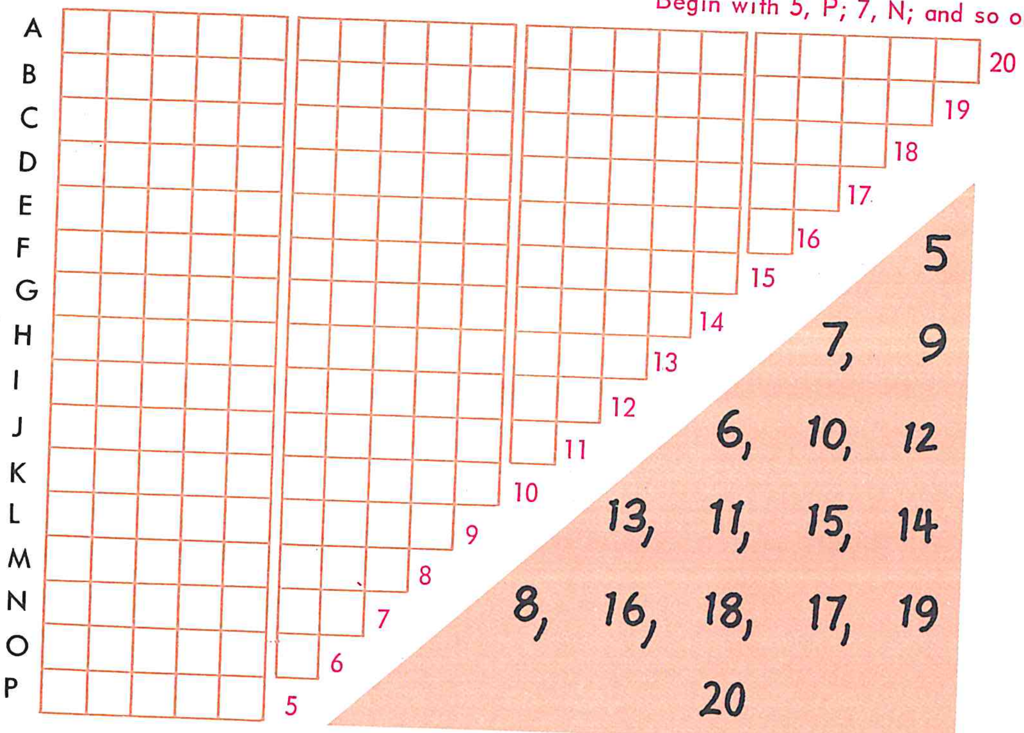
HOW MANY MORE OR LESS?

1. How many squares in each row?
Match each letter with a numeral.

Begin with 5, P; 7, N; and so on.

Have pupils discover the descending pattern.

Count backwards by 5's, by 1's.



Pupils may refer to the rows of squares if necessary but encourage work without help of pictures.

2. How many more is:

a. 12 than 8? 4
14 than 7? 7
13 than 6? 7

b. 15 than 8? 7
17 than 9? 8
16 than 10? 6

Give other similar oral exercises.

3. How many less is:

a. 6 than 15? 9
9 than 18? 9
6 than 14? 8

b. 8 than 16? 8
5 than 15? 10
8 than 17? 9

Continue on page 155.

Help children understand procedure. Stress meaning of symbols and true number sentences. Use some chalkboard examples. Have pupils try some other numbers which will not make true sentences, so they understand the difference.

4. What set of numbers will make the sentence true?

5 + ■ < 8 For ■ try $\{0, 1, 2\}$.

What set of numbers will make each sentence true?

Guide pupils who choose wrong numbers to see why their numbers do not fit.

a		b	
6 + ■ < 15	0, 1–8	7 + ■ < 15	0, 1–7
8 + ■ < 17	0, 1–8	9 + ■ < 16	0, 1–6
9 + ■ < 18	0, 1–8	5 + ■ < 14	0, 1–8

Children may not find all elements for each set. Accept 2 or 3 elements as indicating understanding.

Find three numbers less than 18 for each ■. Make the sentences true.

Answers will vary.
(See G96)

c	d
■ − 9 > 5	■ − 6 > 7
■ − 8 > 4	■ − 7 > 6

Ex. 5. Explain procedure and help pupils show how they arrived at answers. Review use of symbols again as necessary.

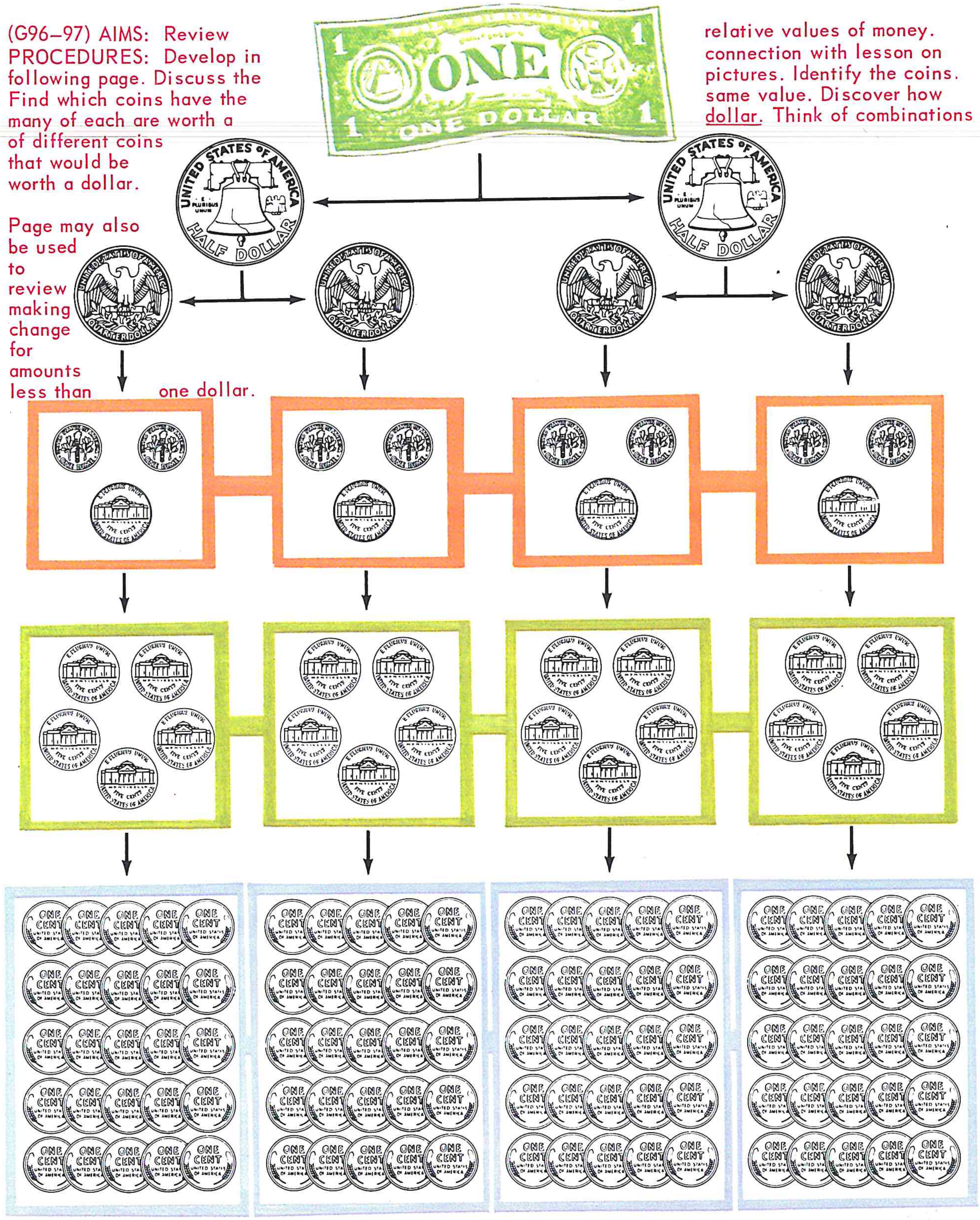
5. For ● write <, =, or > to make each sentence true. Show the number facts.

a	b
4 + 9 = 5 + 8 13 13	13 − 6 > 14 − 8 7 6
5 + 7 < 7 + 7	16 − 8 = 15 − 7
9 + 8 > 6 + 8	18 − 8 = 17 − 7
5 + 11 < 7 + 10	17 − 9 > 16 − 9
7 + 8 = 6 + 9	15 − 8 < 16 − 5

FOLLOW-UP: C1, 2, 3, 4 (G113)

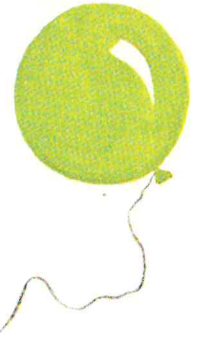
(G96–97) AIMS: Review relative values of money. PROCEDURES: Develop in connection with lesson on following page. Discuss the pictures. Identify the coins. Find which coins have the same value. Discover how many of each are worth a dollar. Think of combinations of different coins that would be worth a dollar.

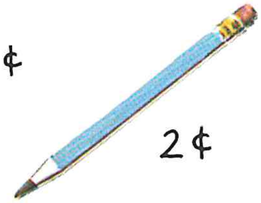
Page may also be used to review making change for amounts less than one dollar.



(G96–97) AIMS: Write number sentences for problems; find and interpret answers; estimate answers.
ACTIVITIES: F10, 11, 12 (G119)
PROCEDURES: Discuss dictionary box at right. Find pictures of $1.00 and coins on page before; develop understanding of relative values.

WRITE THE NUMBER SENTENCE





$1.00 means one dollar

Let class talk about favors for Tommy's party, (G96–97) and decide how to find cost of several items. Complete charts, then ask pupils to state answers as number sentences. See teaching suggestions. (G96–97)

1. Find the cost of pencils:
for 6 children
for 3 children
for 2 children
for 4 children

1	2¢
2	4 ¢
3	6 ¢
4	8 ¢
5	10 ¢
6	12 ¢
7	14 ¢
8	16 ¢
9	18 ¢
10	20 ¢

2. Find the cost of balloons:
for 1 child
for 4 children
for 3 children
for 6 children

1	3¢
2	6 ¢
3	9 ¢
4	12 ¢
5	15 ¢
6	18 ¢

Have answers written as number sentences.

3. With 12¢ Tommy could buy 6 pencils or 4 balloons? Notice two parts of problem.

4. For 15¢ he could buy 5 balloons. Several forms of sentence are correct for same problem.

5. With 14¢ he could buy 7 pencils.

6. Tommy had $1.00. He bought 6 paper hats at 10¢ each. How much did they cost? 60¢
Did he have as much as 50¢ left? no
Did he have less than 50¢ left? yes

Discuss the meaning of each number sentence.

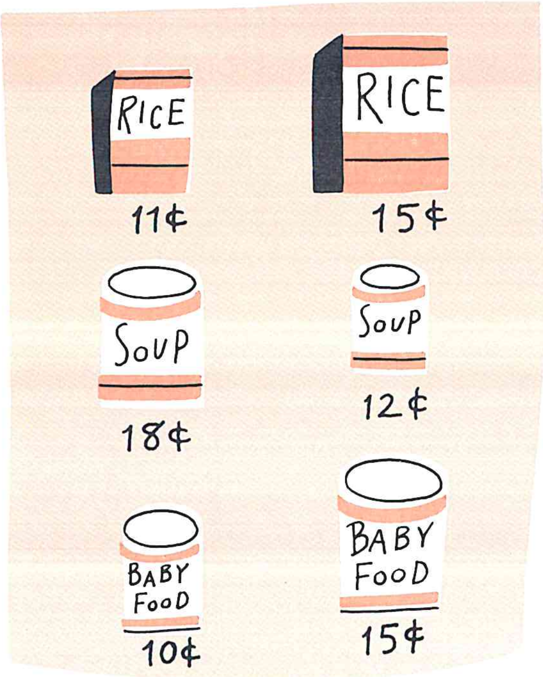
FOLLOW-UP: Extend lesson with some more simple problems and experiences in making change.

(G97–98) AIMS: Interpret a number sentence in terms of a problem situation.
ACTIVITIES: Buying and selling using toy money.
PROCEDURES: Discuss pictures of foods and prices. Guide pupils to read each number sentence and make up stories as directed.

PROBLEMS ABOUT MONEY

See suggested possibilities (G97).

1. Tell a story for each number sentence.
Use the pictures to help you.



11¢ + 4 ¢ = 15¢
11¢ + 15¢ = 26 ¢
11¢ + 11¢ = 22 ¢

18¢ − 12¢ = 6 ¢
12¢ + 12¢ = 24 ¢
12¢ + 12¢ + 12¢ = 36 ¢ (See G97)

10¢ + 10¢ + 15¢ = 35 ¢
15¢ − 10¢ = 5 ¢
4 dimes = 40¢
10 dimes = $1.00

Give some more examples of this kind.

Have pupils look again at the chart on text page 156 if they need review. Help with suggestions for stories. (G97–98)

2. Tell a story for these number sentences.
$1.00 − 50¢ = 50 ¢   40¢ + 60¢ = $1.00
$1.00 = 4 quarters

Ex. 3 can be used to provide further practice on problem solving. Guide the children in expressing stories and number sentences in the simple mathematics language they have learned.

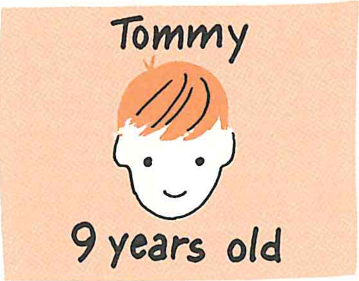
3. Find 3 other pictures.
Make a problem about each picture.
Write the number sentence.
Find the answer.
Tell what the answer means.

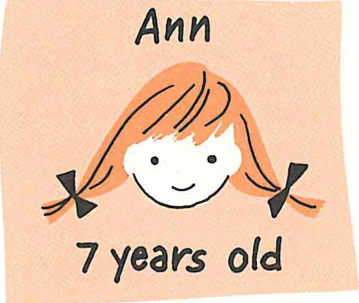
FOLLOW-UP: Use suggestions for Ex. 3.

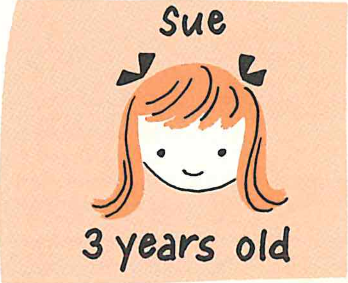
(G98) AIMS: Compare ages and find differences; write number sentences; interpret answers; make up number stories. ACTIVITIES: B 22 a–c (G112)
PROCEDURES: Have pupils discuss the ages of the children; then have them read and interpret the problems.

PRACTICE WITH PROBLEMS

Read each problem. What does it tell? What does it ask? Write the number sentence and find the answer. Tell what the answer means.







1. How much older is Ann than Sue? Tommy than Sue? Tommy than Ann?
2. How old was Tommy two years ago? How old was Ann then? Sue?

In Ex. 1, chalkboard illustrations will make clear that there are several parts to the problem. See also discussion on G98. Question children as they take each step, bringing out fact that differences will always remain the same. Number facts involved are very simple, but the thinking ways may need clarifying.

3. How old will Tommy be seven years from now? How old will Ann be? Sue?
4. How old will Tommy be ten years from now? Ann? Sue?
5. Was the difference in their ages the same two years ago? Will it be the same seven years from now?
6. Tell a number story about the ages of children you know.

FOLLOW-UP: Ex. 6 may be used either for follow-up or for regular class work.

READING A MAP

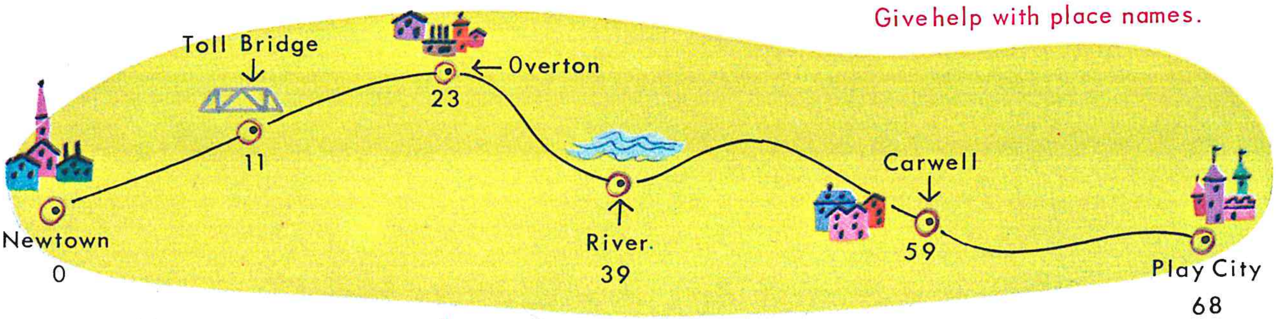
(G98–99) AIMS: Read and interpret number problems; tell the story for the problems; determine the number sentence; find the answer and tell what it means.

ACTIVITIES: J 1–3 (G122) Discuss maps, what the marks mean.

PROCEDURES: Have the class find the names of places and the distances on the map. Lead them to suggest how the difference in distances between places can be found. (by subtracting)

Give help with place names.

1. This shows the road to Play City.



Have children express a – e as number sentences.

Find how many miles: Accept any correct form.

a. From Newtown to the toll bridge 11 miles (0 + 11 = 11) (11 − 0 = 11)

b. From the toll bridge to Overton 12 miles (23 − 11 = 12) (11 + 12 = 23) and so on.

c. From Overton to the river 16 miles (39 − 23 = 16)

d. From the river to Carwell 20 miles (59 − 39 = 20)

e. From Carwell to Play City 9 miles (68 − 59 = 9)

Let the class use Ex. 2 – 7 orally. Later the number sentences and answers may be written.

2. How far is the river from Newtown? 39 miles

3. How far is the toll bridge from the river? 28 miles

4. How far is it from Overton to Carwell? 36 miles

5. How far is Play City from Overton? 45 miles

6. Look at your answers in Exercise 1.
b is 1 mile more than a.
c is 4 miles less than d.

Some pupils may be able to figure out more difficult problems of distance by using what they know about adding 10 or 5.

39 + 29 = 39 + 20 + 9
= 59 + 1 + 8 = 68

7. Find a distance that is a little less than 10 miles. 9 miles (Carwell to Play City)

Continue on page 161.

For Ex. 1 – 6 the possibilities for questions suggested on G99 will be helpful. The lesson may be readily extended by having children make up more problems about a stay at the lake. Give help with new words. Work with separate groups if some children have difficulty with reading the problems.

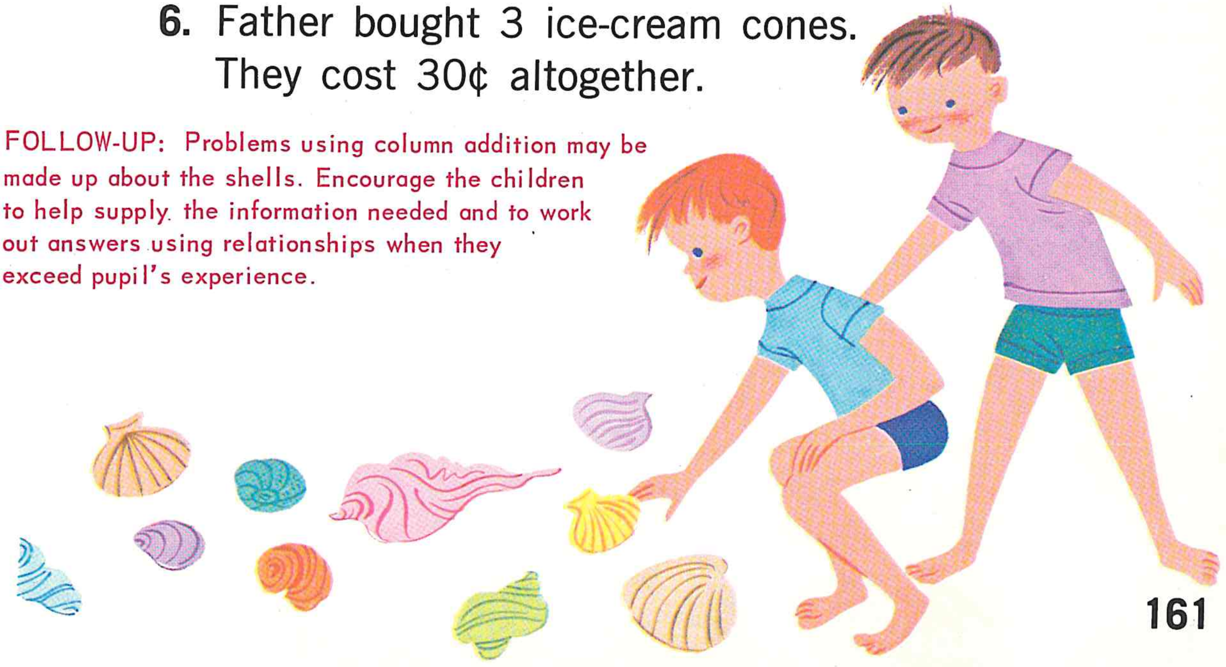
ASK THE QUESTIONS

Read each problem. Ask the question.
Write the number sentence.
Tell what the answer means.

Encourage pupils to think of more than one number sentence to express an idea.

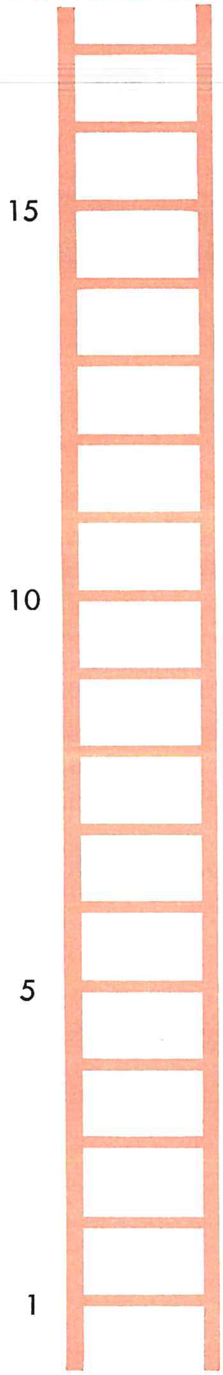
1. Father drove 68 miles to the lake and 70 miles coming back another way.
2. At the lake the boys found 16 shells. They kept 10.
3. They stayed in the water 30 minutes in the morning and 30 minutes in the afternoon.
4. They played in the sun for 40 minutes and under the umbrella for 15 minutes.
5. They saw two men fishing. One man had 8 fish and the other had 7.
6. Father bought 3 ice-cream cones. They cost 30¢ altogether.

FOLLOW-UP: Problems using column addition may be made up about the shells. Encourage the children to help supply the information needed and to work out answers using relationships when they exceed pupil's experience.



(G99–100) AIMS: Practice addition and subtraction facts; find the missing addend. ACTIVITIES: A 5–8, 14; B 7–9 (G106) Explore the number ladder. Have children discover it can be used as a number line. Find 1; 5; 9; 14. PROCEDURES: Encourage children who can do so to work without reference to the number ladder. Later they can check their work for accuracy by using the ladder.

PRACTICE



1. Write the missing numerals.

9 + 7 = 16
7 + 8 = 15
9 + 9 = 18
6 + 9 = 15
9 + 8 = 17

9 + 6 = 15
7 + 8 = 15
9 + 9 = 18
8 + 8 = 16
9 + 8 = 17

2. Addition and subtraction.

Have children tell which are related facts and facts which helped them with answers. (near doubles, doubles, etc.)

a.

8	8	6	6	7	7
+8	+7	+10	+9	+7	+6
16	15	16	15	14	13

b.

9	8	10	9	8	7
+9	+9	+ 7	+7	+10	+10
18	17	17	16	18	17

Which facts in c and d are reverses of doubles?

c.

16	16	14	14	14	13
− 8	− 9	−10	− 9	− 7	− 7
8	7	4	5	7	6

d.

15	15	15	18	17	17
− 5	− 6	− 9	− 9	− 8	− 9
10	9	6	9	9	8

FOLLOW-UP: Use any of the activities in Sections A and B (G105–113) adjusting them to facts with sums or minuends through 18.

(G100) AIMS: Practice adding three numbers; check by adding in opposite direction.
ACTIVITIES: G 1–8 (G120)
PROCEDURES: Help pupils with instructions. Review steps for adding more than two numbers. "What do the arrows indicate?" Use a number of similar chalkboard examples. Have pupils explain the steps illustrated.

ADDING THREE NUMBERS

1. Add down. Then add up.

2 ↓ ↑
3
7
12

2 + 3 = 5
5 + 7 = 12

Check your work.

7 + 3 = 10
10 + 2 = 12

Is 12 the same as 12 ? Yes

Encourage children to check their work each time.

2. 3 ↓ ↑
5
4
12

3 + 5 = 8
8 + 4 = 12

Check:

4 + 5 = 9
9 + 3 = 12

Is 12 the same as 12 ? Yes

3. 3 ↓ ↑
7
8
18

3 + 7 = 10
10 + 8 = 18

Check:

8 + 7 = 15
15 + 3 = 18

Is 18 the same as 18 ? Yes

Do not require showing the steps as above if pupils have a good grasp of the operation.

4.

6	5	4	7	9	4
2	2	3	2	2	3
3	6	4	4	7	9
11	13	11	13	18	16

5.

2	3	2	6	1	2
6	8	7	7	8	9
7	5	5	3	7	5
15	16	14	16	16	16

FOLLOW-UP: Use activities from the Sections A–G (G105) to correct weaknesses.

(G100–101) AIMS: Use higher decade addition and subtraction with and without reference to a picture line.
ACTIVITIES: J 1a, b, 3, 4 (G122)
PROCEDURES: Explore the picture line. How far does it extend? Explain that they must think of the pictures as a part of a line extending much longer in both directions. Help pupils remember that they move to the right when adding; to the left when subtracting.

WORKING WITH LARGER NUMBERS

In Ex. 1 work with pupils through several examples, helping them use the pictures for basic facts, or to locate answers in the next decade.

1. Find the answers. Use the picture line.

Start with:	Add:	How many:	Start with:	Subtract:	How many:	Start with:	Watch the signs.	How many:
25	2	27	49	5	44	28	− 3	25
30	3	33	38	6	32	24	− 4	20
45	4	49	47	4	43	42	+ 5	47
50	5	55	36	2	34	36	+ 3	39
32	7	39	29	3	26	52	+ 6	58
25	3	28	28	4	24	68	− 2	66
31	6	37	57	2	55	17	− 6	11
62	5	67	89	6	83	79	− 4	75
83	6	89	66	3	63	85	+ 4	89
70	8	78	78	5	73	92	+ 7	99

Have pupils do Ex. 2 without using picture line if possible.

2. Write the missing numerals.

a. 28 + 2 = 30
36 + 4 = 40
24 + 6 = 30
42 + 8 = 50
35 + 5 = 40

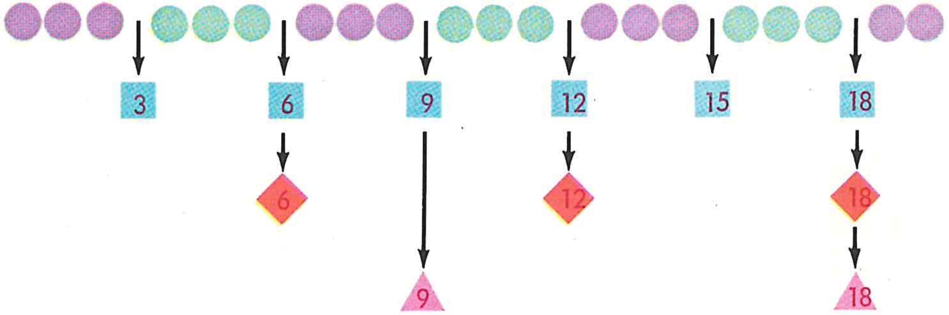
b. 30 + 8 = 38
40 + 4 = 44
30 + 6 = 36
50 + 9 = 59
20 + 7 = 27

FOLLOW-UP: Have children close books and write answers or respond orally as you dictate examples from Ex. 2 varying the order. For individual help use Section J 1–3 (G122).

(G101) AIMS: Relate multiplication and division ideas.
ACTIVITIES: A12, 16; B24 (G107)
PROCEDURES: Guide the pupils in exploring the picture lines. Bring out relationships between three, six, and nine, and between two, four, and eight. "What do the arrows show? Count the circles by 3's. How many 3's? Is there something left? (2) How many altogether?" (20)

COMPARING

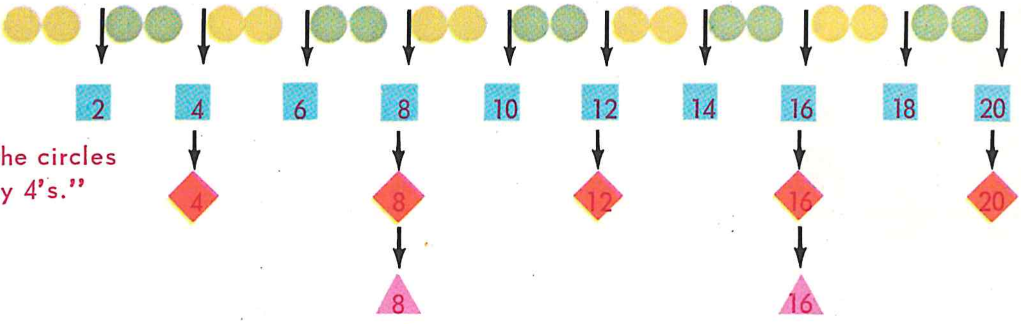
1. Look at the first picture line.
How many threes and how many more?
What frames mark sets of 3, 6, and 9?



4 threes = 2 sixes
2 sixes = 4 threes
3 sixes = 6 threes

3 threes = 9
5 threes = 15
2 nines = 18

2. Explore the line in a similar way.



"Count the circles by 2's; by 4's."

How many twos in this picture line? 10
How many ○'s altogether? 20
What numeral would you write for each 🟦 ?
for each ♦ ? for each ▲ ?

4 twos = 8
9 twos = 18

2 fours = 8
3 sixes = 18

2 eights = 16
4 fours = 16

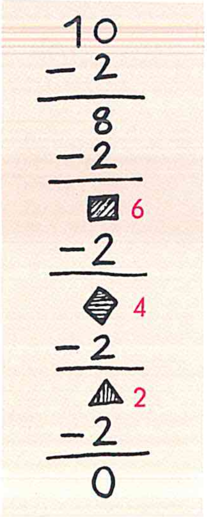
Continue on page 166.

Use the models at the right to develop division as successive subtraction. Have pupils study the illustrations, completing the subtractions. Work out on the chalkboard several such examples. Help children tell what they did and what they learned.

3. Start with 10. How many times can you subtract 2? 5
Start with 14. How many times can you subtract 2? 7

5 twos = 10
4 twos = 8
6 twos = 12
3 twos = 6

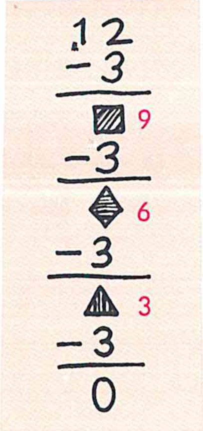
10 twos = 20
7 twos = 14
9 twos = 18
8 twos = 16



4. Start with 12. How many times can you subtract 3? 4
Start with 15. How many times can you subtract 3? 5

4 threes = 12
2 threes = 6
5 threes = 15

3 threes = 9
1 threes = 3
6 threes = 18



5. Start with 16 and subtract fours.

2 fours = 8
3 fours = 12

5 fours = 20
4 fours = 16

Pupils may look back to pictures on page 165 to check answers.

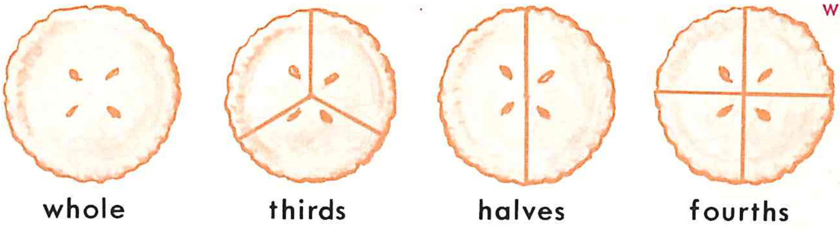
6. Start with 6 and subtract ones.
How many ones in 6? 8? 15? 20?

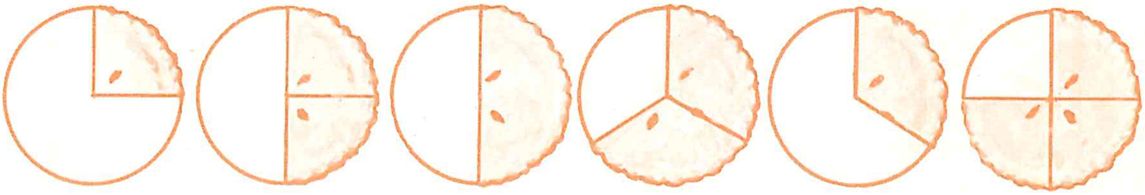
FOLLOW-UP: B13, 24 (G111)

(G101–102) AIMS: Understand thirds, halves, and fourths of an object; subtract these parts; solve simple problems using pictures. ACTIVITIES: K 1b, 2, 3 (G123).
PROCEDURES: Have pupils read the problem, discuss the picture, and find the pie each girl cut. Bring out the idea of 3 thirds, 4 fourths, 2 halves in a whole.

FIND THE FRACTION PICTURE

Help with reading vocabulary.





1. Find the pictures in the first row.
   Alice cut her pie into thirds.
   Martha cut her pie into halves.
   Ann cut her pie into fourths.

Give help on reading names.

2. Look at the second row of pictures.
   Alice ate one third of her pie. How many thirds were left? 2
   Ann ate one fourth of hers. How many fourths were left? 3
   Martha ate one half of hers. How many halves were left? 1

Follow a similar procedure in Ex. 2. Guide children in matching pictures and words. "If Ann ate two fourths, what was left? Would two fourths be the same as one half? Look at picture to see."

See if pupils can tell a story about any unmatched pie.

3. When Alice had eaten two thirds of her pie, how many thirds were left? 1
   When Ann had eaten three fourths of her pie, how many fourths were left? 1

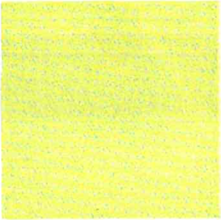
FOLLOW-UP: Extend the lesson with more pictures on the chalkboard. (G102)

(G102–103) AIMS: Develop understanding of halves, thirds, and fourths; relative sizes of fractional parts; the whole number one expressed by a fraction.
ACTIVITIES: K 1–6 (G123)
PROCEDURES: Guide pupils in discussion of the pictures and of the fraction names. Compare sizes of parts B – D with E – I. Help identify matching parts before proceeding to Ex. 2. Bring out that A, B, C, D are same size. See teaching suggestions (G102).

FRACTIONAL PARTS

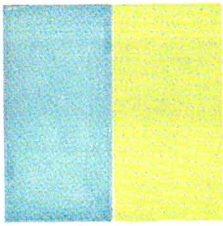
1. Tell about each picture.

A



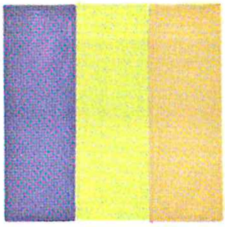
one whole

B



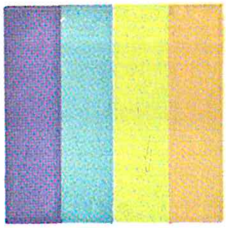
two halves

C



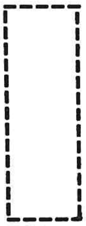
three thirds

D



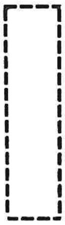
four fourths

E



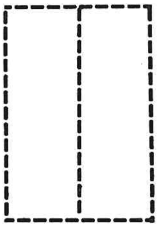
one third

F



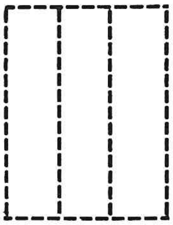
one fourth

G



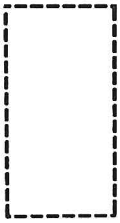
two thirds

H



three fourths

I



one half

Encourage the children to use the pictures to complete Ex. 2 and 3.

2. Which is the right answer?

E is equal to F; larger than F. larger
D is equal to G; larger than G. larger
A is equal to D; larger than D. equal
F is equal to G; smaller than G. smaller
C is equal to B; smaller than B. equal

Help pupils tell why in each case. (A third is bigger than a fourth of the same object.)

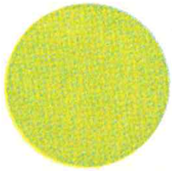
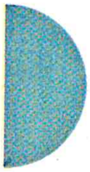
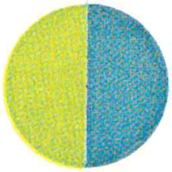
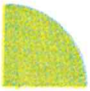
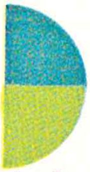
3. How many parts the size of F would make H? 3

2 E = G
3 E = C
4 F = D
2 F = I
2 I = B
3 E = A

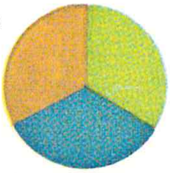
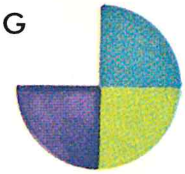
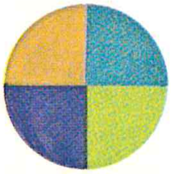
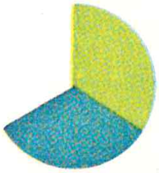
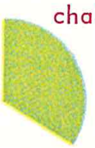
Continue on page 169. Help pupils with the letter I. They may read it as "one" in which case they would be correct in saying 4 F = one whole.

In Ex. 4, explain that the digit below the line tells the number of parts of the whole; the digit above the line tells the number of parts we are thinking about or using. Give many opportunities for practice in writing the fractions. Help pupils compare size of digits as they write the numerals for whole numbers and rational numbers.

4. Match each picture with a fraction.

A

B

C

D

E


Lesson may be extended by cutting paper into fractional parts and writing the fraction on each. Pupils may name the parts while one child writes the fractions on the chalkboard.

F

G

H

I

J


Give help on reading if necessary. Ask individuals to read the number words for letters you call in varied order.

$\frac{1}{2}$, $\frac{1}{4}$, 1, $\frac{2}{4}$, $\frac{2}{2}$, $\frac{3}{4}$,
$\frac{1}{3}$, $\frac{4}{4}$, $\frac{3}{3}$, $\frac{2}{3}$

5. Match the fractions in **4** with the number words below.

Also match with pictures in Ex. 4.

a. one half B or M
b. one third J
c. three thirds F
d. four fourths H or A
e. two fourths E or B
f. two halves C or A
g. one fourth D
h. two thirds I
i. three fourths G
j. one whole A or C

In Ex. 6, ask a number of questions to give practice in adding and subtracting rational numbers. Use flannel board demonstrations or chalkboard drawings to illustrate.

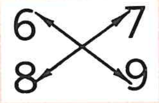
6. If you take away one half of picture C, what will be left? $\frac{1}{2}$
If you take away one third of picture F, what will be left? $\frac{2}{3}$

FOLLOW-UP: Guide the class in the oral exercise suggested on G103.

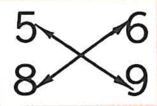
(G103) AIMS: Review some of the basic concepts developed in the chapter.

DO YOU REMEMBER?

1. Follow the arrows and add the numbers.



6 + 9 = 15
7 + 8 = 15
9 + 6 = 15
8 + 7 = 15



6 + 8 = 14
9 + 5 = 14
8 + 6 = 14
5 + 9 = 14

2. What is missing?

a	**b**
152 = 100 + 50 + 2	4 fours = 8 twos
128 = 100 + 20 + 8	6 twos = 3 fours
175 = 100 + 50 + 25	2 eights = 4 fours
116 = 100 + 10 + 6	6 threes = 3 sixes
135 = 100 + 30 + 5	2 nines = 6 threes

3. Add or subtract.

$$\begin{array}{r}145\\-\ \ 23\\\hline 122\end{array}\qquad\begin{array}{r}181\\+\ \ 17\\\hline 198\end{array}\qquad\begin{array}{r}162\\+\ \ 37\\\hline 199\end{array}\qquad\begin{array}{r}178\\-\ \ 23\\\hline 155\end{array}\qquad\begin{array}{r}140\\+\ \ 28\\\hline 168\end{array}\qquad\begin{array}{r}106\\-\ \ \ 2\\\hline 104\end{array}$$

4. Write the missing numerals.

a. 6 + 7 = 13 26 + 7 = 33 38 + 5 = 43
b. 15 − 8 = 7 65 − 8 = 57 54 − 7 = 47
c. 49 + 8 = 57 68 − 9 = 59 28 + 8 = 36

Continue on page 171.

5. Write >, <, or = to make each sentence true.

a	b
$6 + 8$ = $5 + 9$	$16 - 8$ > $14 - 7$
$7 + 8$ < $10 + 7$	$18 - 9$ = $16 - 7$
$5 + 9$ < $9 + 6$	$14 - 4$ < $15 - 3$
\$1.00 > 50¢ + 10¢	$17 - 4$ = $17 - 2 - 2$
25¢ + 15¢ < 45¢	$15 - 8$ = $17 - 10$

6. **a.** If Monday was June 8, what dates were the day before and the day after? 7, 9

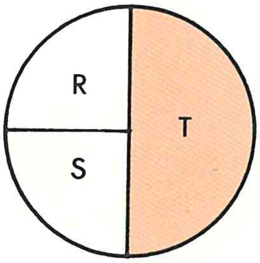
b. Bobby won the second game, the fifth game, and the ninth game. How many games did he win? 3

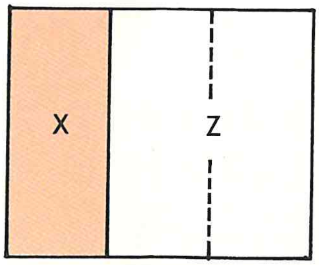
c. You are 7 years old. Your dog is 3 years old. How much older are you? 4

d. Ann walked 6 blocks north and 6 blocks east. How many blocks did she walk? 12

7. Match the pictures and the number words.

a. one half T
b. one third X
c. two thirds Z
d. one fourth R or S





FOLLOW-UP: Any needed activities Section A–K (G105).

AIMS: Test knowledge of number facts, concepts, higher decade addition and subtraction, problem solving.

DO YOU KNOW?

Write the missing numerals.

1.

142	169	111	156	32	75
+ 34	− 42	+ 58	− 14	+97	+82
176	127	169	142	129	157

2.

a	b	c
6 + 8 = 14	5 + 6 = 11	5 + 7 = 12
8 + 6 = 14	7 + 4 = 11	8 + 3 = 11
9 + 4 = 13	4 + 8 = 12	9 + 5 = 14

3.

8 + 9 = 17	17 − 7 = 10	18 − 9 = 9
9 + 7 = 16	16 − 8 = 8	15 − 6 = 9

4. Make the sentences true.

a	b
4 + 9 > 5 + ☐ 7, 6, 5, . . . 1, 0	15 − 8 = 14 − 7
6 + 8 < 9 + ☐ 6, 7, 8 . . .	12 − 7 < 11 − ☐ 5, 4, 3, 2, 1, 0

5. Write the numerals.

1 hundred + 2 tens + 3 ones 123

1 hundred + 9 tens + 8 ones 198

5 tens + 7 ones 57

1 ten + 8 ones 18

6. Write the missing numerals.

125 130 135 140 145 150 155 160

Continue on page 173.

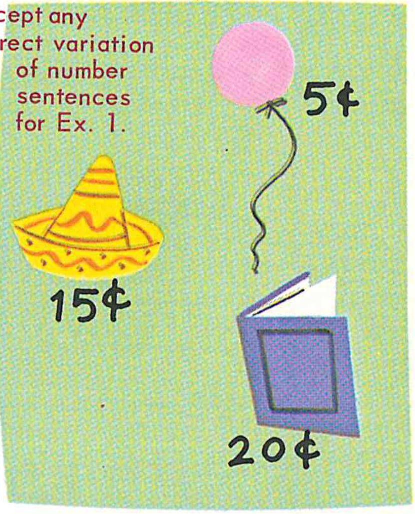
Test page continued from page 172.

DO YOU KNOW?

1. Write the number sentence. Find the answer.
   - **a.** How much would you pay for a balloon, a hat, and a book? 40¢ Did you add or subtract? Add
   - **b.** How much more does the book cost than the balloon? 15¢ 20 − 5 = 15
   - **c.** If you had 12¢ and bought a balloon, how much money would be left? 7¢ 12 − 5 = 7 Did you add or subtract? Subtract

5¢ + 15¢ + 20¢ = 40¢

Accept any correct variation of number sentences for Ex. 1.

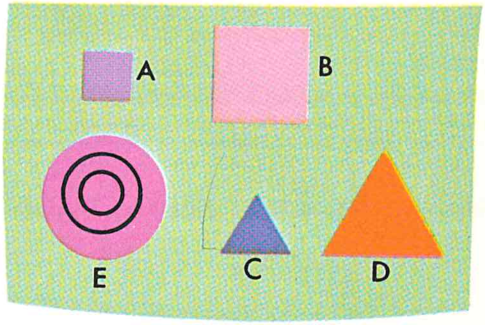


2. 7 feet = 1 yard and 4 feet
15 feet = 5 yards
12 inches = 1 feet

1 quart = 4 cups
1 quart = 2 pints
1 gallon = 4 quarts

3. Look at the pictures.
Is A larger than B? No
Is C smaller than D? Yes
How many circles in E? 3

Accept 2 if child says he counted the black lines.



4. 2 fours = 8
2 fives = 10
2 nines = 18

2 sevens = 14
4 threes = 12
2 sixes = 12

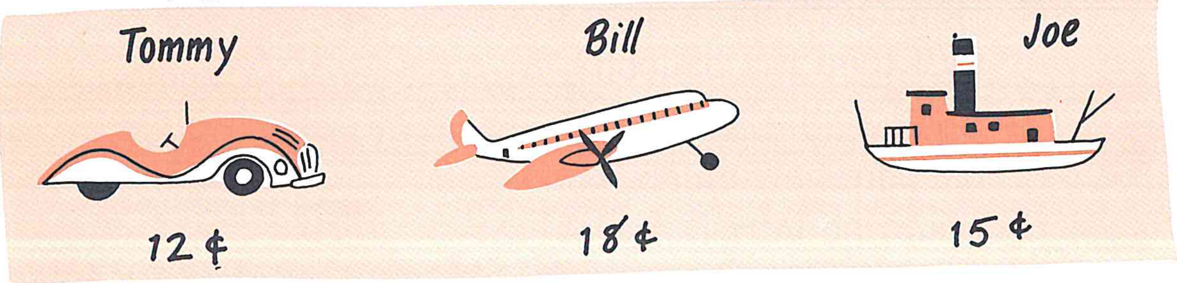
3 tens = 30
5 fives = 25
8 twos = 16

(G104) AIMS: Read, interpret, and solve problems using money; make comparisons; recognize equal values.
PROCEDURES: Pupils who have shown the ability to solve problems may use this lesson as independent work.

ENRICHMENT

1. What toy did each boy buy? How much did it cost? See pictures.

2. Each boy had 25¢. How much change did each boy get? Tommy, 13¢; Bill, 7¢; Joe, 10¢



3. Read what each boy says. Find the answer to make an even trade.
   - a. Bill to Joe: "I will ~~trade~~ my airplane for your boat and 3¢."
   - b. Bill to Tommy: "I will trade my airplane for your car and 6¢."
   - c. Tommy to Joe: "If you will trade your boat for my car, I will give you 3¢."

If lesson is used for class discussion, let pupils think of another toy for each boy, tell what it cost, and make up a problem. Keep cost under 25¢.

4. Find the answer to show if the trade is an even trade.
   - a. Tommy to Bill: "I will give you a nickel and my car for your airplane." No, 12¢ + 5¢ = 17¢
   - b. Joe to Bill: "I will give you my boat and a nickel for your airplane." No, 15¢ + 5¢ = 20¢

Encourage careful analysis of problems and independent thinking.

AIMS: Develop mastery of number facts.
PROCEDURES: Use as extension of lessons, independent work, or test of understandings.

PRACTICE (Chapter 1)

1. Find the answers.

a.	4	3	5	2	9	6
	+4	+7	+6	+7	+1	+3
	8	10	11	9	10	9
b.	8	4	3	8	4	2
	+2	+7	+5	+3	+6	+9
	10	11	8	11	10	11

2. Write the missing numerals.

a.	3	6	7	2	3	5
	+ 6	+ 5	+ 3	+ 6	+ 8	+ 5
	9	11	10	8	11	10
b.	3	6	7	6	2	6
	+ 7	+ 5	+ 2	+ 4	+ 9	+ 2
	10	11	9	10	11	8
c.	5	4	8	7	5	2
	+ 3	+ 5	+ 1	+ 4	+ 4	+ 8
	8	9	9	11	9	10

3. a. Find the third fact in the first row.
What is the answer? 11

b. Find the first fact in the fifth row.
What is the answer? 8

c. Find the fourth fact in the second row.
What is the answer? 11

AIMS: Develop mastery of facts; find missing numbers; practice addition and subtraction.
PROCEDURES: Use as extension of lessons, independent work, or test of understandings.

PRACTICE (Chapter 2)

1. Find the answers. Use the picture line if you need it.

a.

$$\begin{array}{r} 11 \\ -\ 8 \\ \hline 3 \end{array} \qquad \begin{array}{r} 10 \\ -\ 2 \\ \hline 8 \end{array} \qquad \begin{array}{r} 12 \\ -\ 6 \\ \hline 6 \end{array} \qquad \begin{array}{r} 11 \\ -\ 9 \\ \hline 2 \end{array} \qquad \begin{array}{r} 10 \\ -\ 5 \\ \hline 5 \end{array} \qquad \begin{array}{r} 12 \\ -\ 4 \\ \hline 8 \end{array}$$

b.

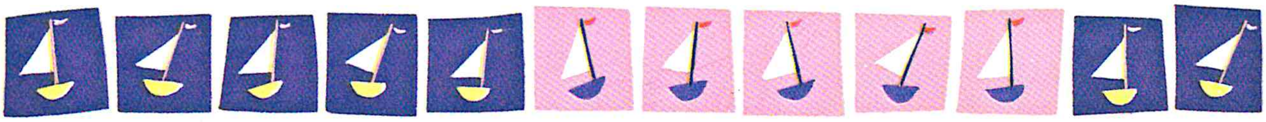
$$\begin{array}{r} 10 \\ -\ 8 \\ \hline 2 \end{array} \qquad \begin{array}{r} 11 \\ -\ 6 \\ \hline 5 \end{array} \qquad \begin{array}{r} 12 \\ -\ 9 \\ \hline 3 \end{array} \qquad \begin{array}{r} 10 \\ -\ 7 \\ \hline 3 \end{array} \qquad \begin{array}{r} 11 \\ -\ 5 \\ \hline 6 \end{array} \qquad \begin{array}{r} 9 \\ -\ 7 \\ \hline 2 \end{array}$$

c.

$$\begin{array}{r} 8 \\ -5 \\ \hline 3 \end{array} \qquad \begin{array}{r} 9 \\ -4 \\ \hline 5 \end{array} \qquad \begin{array}{r} 11 \\ -\ 7 \\ \hline 4 \end{array} \qquad \begin{array}{r} 9 \\ -6 \\ \hline 3 \end{array} \qquad \begin{array}{r} 8 \\ -4 \\ \hline 4 \end{array} \qquad \begin{array}{r} 12 \\ -\ 7 \\ \hline 5 \end{array}$$

2. What is missing? Write the numerals.

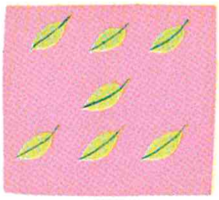
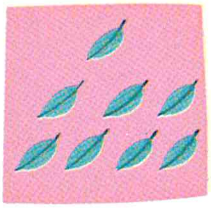
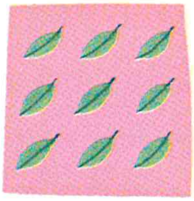
a	**b**	**c**
$6 + \boxed{5} = 11$	$10 - \boxed{7} = 3$	$12 - \boxed{5} = 7$
$2 + \boxed{10} = 12$	$12 - \boxed{4} = 8$	$10 - \boxed{6} = 4$
$1 + \boxed{9} = 10$	$11 - \boxed{5} = 6$	$9 - \boxed{3} = 6$
$\boxed{3} + 8 = 11$	$10 - \boxed{1} = 9$	$12 - \boxed{8} = 4$
$\boxed{5} + 7 = 12$	$\boxed{9} - 4 = 5$	$11 - \boxed{7} = 4$
$\boxed{2} + 9 = 11$	$\boxed{11} - 3 = 8$	$12 - \boxed{10} = 2$
$2 + \boxed{8} = 10$	$\boxed{9} - 7 = 2$	$12 - \boxed{6} = 6$
$4 + \boxed{4} = 8$	$10 - \boxed{5} = 5$	$\boxed{6} - 3 = 3$
$6 + \boxed{6} = 12$	$11 - \boxed{9} = 2$	$\boxed{8} - 6 = 2$



AIMS: Extend understanding of column addition; checking for accuracy; and use of associative property of addition.
PROCEDURES: Use as extension of lessons, independent work, or test of understandings.

PRACTICE (CHAPTER 2)

Add down, then add up.
Use the picture line if you need help.

1.		3 4 1 4 3		1 3 4		3 3 3
		7		8		9

2.	4	4	5	6	2	2
	2	2	3	4	1	3
	3	2	3	2	4	2
	9	8	11	12	7	7
3.	1	2	3	2	3	5
	4	2	4	3	1	3
	3	2	2	5	4	2
	8	6	9	10	8	10
4.	1	1	5	4	6	1
	5	7	4	4	3	5
	2	3	3	1	2	1
	8	11	12	9	11	7
5.	4	3	2	5	4	4
	3	1	7	4	4	1
	1	2	1	2	4	5
	8	6	10	11	12	10

AIMS: Find missing numbers; successive addition. Use multiplication facts for 2's and 3's; understand other names for numbers.
PROCEDURES: Use as extention of lessons, independent work, or test of understandings.

PRACTICE (Chapter 3)

Write the missing numerals.

1. $\underbrace{6 + 3}_{9} \xrightarrow{} + \boxed{4} = 13$

$9 + \boxed{4} = 13$

$\boxed{2} + 4 + 5 = 11$

$5 + 4 + 3 = \boxed{12}$

$3 + 2 + \boxed{7} = 12$

$\boxed{4} + 4 + 3 = 11$

2. $\underbrace{6 + 5}_{11} = \underbrace{4 + \boxed{7}}_{11}$

$4 + \boxed{7} = 11$

$4 + 6 = 2 + \boxed{8}$

$1 + 8 = 2 + \boxed{7}$

$\boxed{4} + 9 = 6 + 7$

$\boxed{7} + 5 = 4 + 8$

3. $8 - \boxed{0} = 8 = 6 +$ ②

$3 + \boxed{9} = 12 = 8 +$ ④

$11 - \boxed{2} = 9 = 3 +$ ⑥

$13 - \boxed{5} = 8 = 6 +$ ②

$0 + \boxed{10} = 10 = 4 +$ ⑥

4. 2 twos = $13 - \boxed{9}$

3 twos = $12 - \boxed{6}$

4 threes = $4 + \boxed{8}$

2 threes = $13 - \boxed{7}$

5 twos = $7 + \boxed{3}$

5. $3 + 2 + 5 = 4 + \boxed{6}$

$5 + 2 + 4 = 7 + \boxed{4}$

$3 + 7 + 2 = 8 + \boxed{4}$

$7 + 2 + 4 = 5 + \boxed{8}$

$6 + 1 + 5 = 7 + \boxed{5}$

6. $13 - 5 = 12 - \boxed{4}$

$12 - 4 = 11 - \boxed{3}$

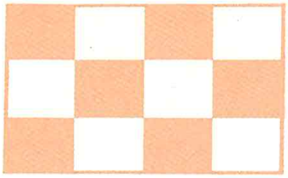
$10 - 2 = 13 - \boxed{5}$

$11 - 7 = 10 - \boxed{6}$

$13 - 7 = 12 - \boxed{6}$

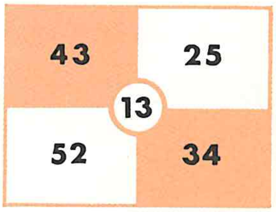
AIMS: Use number facts; add and subtract 2-digit numbers; add tens; add and subtract zero and one.
PROCEDURES: Use as an extension of lessons, independent work, or test of understanding.

PRACTICE (Chapter 4)



1. How many white squares? ● 6
How many red squares? + ▲ 6
How many squares in all? ■ 12

2. a. In the picture at the right, add the 13 in the circle to each of the other numbers. 56, 38, 65, 47



b. Add the numbers in the red squares. 77
c. Add the numbers in the white squares. 77
d. Add the numbers in the top row. 68
e. Add the numbers in the bottom row. 86

3. Find the answers.

a.	14¢	65¢	79¢	8¢	7¢	12¢	47¢
	− 9¢	−23¢	−45¢	+6¢	+ 6 ¢	− 7 ¢	+30¢
	5 ¢	42 ¢	34 ¢	14 ¢	13¢	5¢	77 ¢
b.	50¢	68¢	97¢	38¢	42¢	12¢	13¢
	+23¢	−18¢	−26¢	+31¢	+32¢	− 8¢	− 5¢
	73 ¢	50 ¢	71 ¢	69 ¢	74 ¢	4 ¢	8 ¢

4. a. The book costs 65¢. The boat costs 34¢. What is the difference? 31¢
b. What do two boats cost? 68¢

5. Find the answers.

50	61	83	67	96	78	80
+20	+31	+15	−34	−52	−68	+18
70	92	98	33	44	10	98

AIMS: Use concept of more or less; find missing numbers; practice number facts; addition and subtraction.
PROCEDURES: Use as an extension of lessons, independent work, or test of understanding.

PRACTICE (Chapter 5)

1. If you have 12 letters and 4 stamps, how many more stamps do you need?

$12 = 4 + \boxed{8}$

2.

	Letters	Stamps	How many more?	Letters	Stamps	How many more?
a.	15	8	7	15	5	10
b.	14	9	5	12	5	7
c.	13	7	6	14	6	8
d.	12	9	3	12	7	5
e.	15	6	9	13	5	8
f.	14	4	10	13	8	5

3. Write the missing numerals.

a.

$5 + \boxed{8} = 13$
$9 + \boxed{3} = 12$
$6 + \boxed{7} = 13$
$5 + \boxed{10} = 15$
$4 + \boxed{8} = 12$

b.

$\boxed{6} + 9 = 15$
$\boxed{6} + 6 = 12$
$\boxed{8} + 7 = 15$
$\boxed{7} + 7 = 14$
$\boxed{3} + 12 = 15$

c.

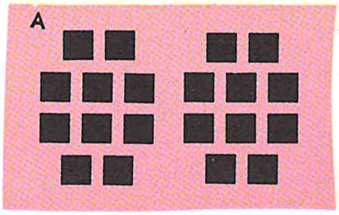
$12 - \boxed{4} = 8$
$12 - \boxed{3} = 9$
$13 - \boxed{4} = 9$
$12 - \boxed{1} = 11$
$14 - \boxed{7} = 7$

d.

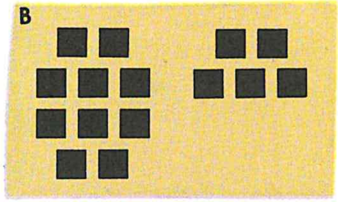
$12 - \boxed{5} = 7$
$13 - \boxed{3} = 10$
$14 - \boxed{6} = 8$
$13 - \boxed{5} = 8$
$14 - \boxed{9} = 5$

AIMS: Understand adding tens, and tens and ones; adding and subtracting to get ten; practice number facts; recognize and use other patterns of ten; review "teen" numbers.
PROCEDURES: Use as an extension of lessons, independent work, or test of understanding.

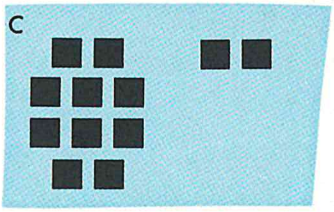
PRACTICE (Chapter 5)



10 + 10 = 20



10 + 5 = 15



10 + 2 = 12

1. Write the missing numerals for pictures A—F.

2. Write the missing numerals.

a.	8	8	8	8	8
	+ 4	+ 6	+ 5	+ 3	+ 7
	12	14	13	11	15
b.	14	12	13	11	15
	− 4	− 2	− 0	− 10	− 5
	10	10	13	1	10
c.	14	11	15	12	13
	− 8	− 8	− 8	− 8	− 8
	6	3	7	4	5

3. Write the missing numerals.

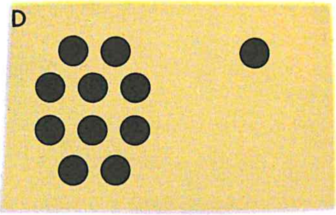
a. 4 + 10 = 14 3 + 10 = 13

b. 2 + 10 = 12 5 + 10 = 15

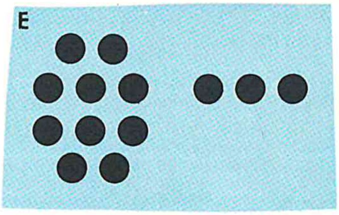
c. 1 + 10 = 11 8 + 5 = 13

d. 6 + 8 = 14 3 + 8 = 11

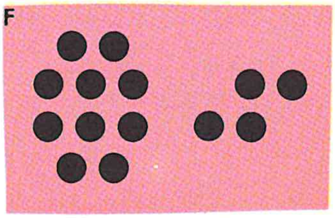
e. 8 + 7 = 15 3 + 10 = 13



10 + 1 = 11



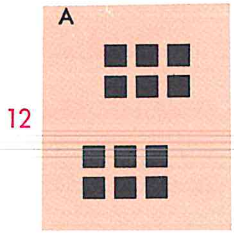
10 + 3 = 13

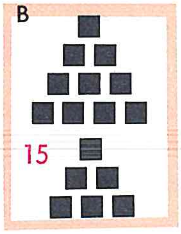


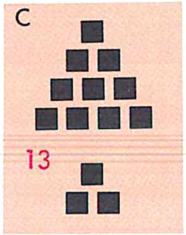
10 + 4 = 14

AIMS: Study and use doubles, near doubles and related facts; practice addition and subtraction; find missing numbers.
PROCEDURES: Use as an extension of lessons, independent work, or test of understanding.

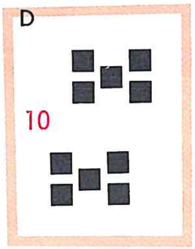
PRACTICE (Chapter 6)





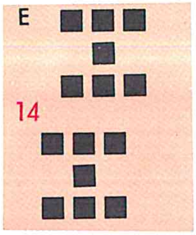


1. How many in each picture?
Write the numerals.



2. Use the doubles facts to help you.
Write the fact and the answer.

$$\boxed{\begin{array}{r} 6 \\ +6 \\ \hline 12 \end{array}} \quad \begin{array}{r} 6 \\ +7 \\ \hline 13 \end{array} \quad \begin{array}{r} 7 \\ +8 \\ \hline 15 \end{array} \quad \begin{array}{r} 6 \\ +5 \\ \hline 11 \end{array} \quad \begin{array}{r} 7 \\ +6 \\ \hline 13 \end{array} \quad \begin{array}{r} 5 \\ +4 \\ \hline 9 \end{array}$$

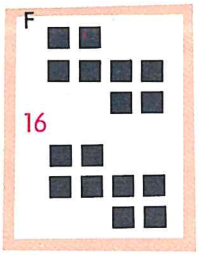


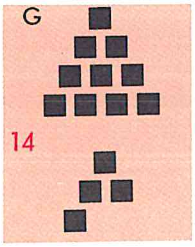
3. Use what you know about adding tens and ones.

Write the missing numerals.

a. $$\begin{array}{r} 10 \\ +\ 3 \\ \hline 13 \end{array} \quad \begin{array}{r} 9 \\ +4 \\ \hline 13 \end{array} \qquad \begin{array}{r} 4 \\ +10 \\ \hline 14 \end{array} \quad \begin{array}{r} 4 \\ +9 \\ \hline 13 \end{array} \qquad \begin{array}{r} 10 \\ +\ 6 \\ \hline 16 \end{array} \quad \begin{array}{r} 9 \\ +6 \\ \hline 15 \end{array}$$

b. $$\begin{array}{r} 5 \\ +10 \\ \hline 15 \end{array} \quad \begin{array}{r} 5 \\ +9 \\ \hline 14 \end{array} \qquad \begin{array}{r} 10 \\ +\ 6 \\ \hline 16 \end{array} \quad \begin{array}{r} 8 \\ +6 \\ \hline 14 \end{array} \qquad \begin{array}{r} 10 \\ +\ 3 \\ \hline 13 \end{array} \quad \begin{array}{r} 9 \\ +3 \\ \hline 12 \end{array}$$





4. Write the missing numerals.

a. 10 + 5 = 15   5 + 10 = 15
b. 9 + 5 = 14   6 + 9 = 15
c. 8 + 8 = 16   6 + 10 = 16

AIMS: Further understanding of symbols; practice making number sentences true; work with liquid measures; add by endings; review sequence of numbers.
PROCEDURES: Use as an extension of lessons, independent work, or test of understanding.

PRACTICE (Chapter 6)

1. Choose =, > , or <. Make the sentences true.

a	**b**
15 inches > a foot	$\frac{1}{2} = \frac{2}{4}$
10 inches < a foot	$\frac{1}{3} < \frac{1}{2}$
1 foot > 11 inches	$\frac{1}{2} > \frac{1}{4}$
12 inches = 1 foot	$1 > \frac{3}{4}$

2. Choose =, > , or <.

a	**b**
2 cups = 1 pint	1 gallon < 6 quarts
1 gallon > 2 quarts	2 pints = 1 quart
4 cups = 1 quart	5 cups > 2 pints

3. Choose =, > , or <.

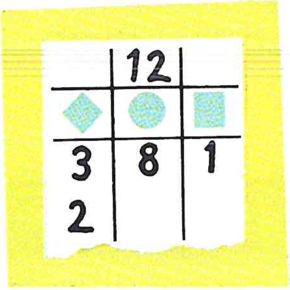
a	**b**
20 + 8 = 22 + 6	20 + 1 = 10 + 11
30 + 4 < 32 + 3	60 + 5 = 55 + 10
40 + 7 > 42 + 3	50 + 3 > 45 + 4

4. Write the missing numerals.

1	2	3	13	14	15
4	5	6	16	17	18
7	8	9	19	20	21
10	11	12	22	23	24

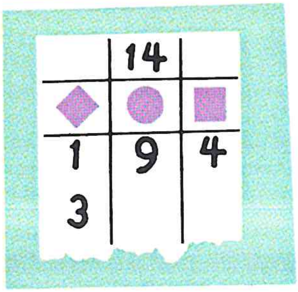
AIMS: Find other names for numbers; add three numbers; find missing numbers; use zero in addition; develop independent thinking.
PROCEDURES: Use as an extension of lessons, independent work, or test of understanding.

PRACTICE (Chapter 7)



1. The sum of three numbers is 12. How many ways can you make the sum? Write 6 ways.

Answers will vary.



2. The sum of three numbers is 14. How many ways can you make the sum? Write 6 ways.

Answers will vary.

3. Write the missing numerals.

a	b
3 + 4 − 1 = 6	10 = 4 + 2 + 4
2 threes − 4 = 2	12 = 5 + 2 + 5
5 twos + 4 = 14	13 = 3 + 5 + 5
6 + 1 + 4 = 11	11 = 4 + 0 + 7
5 + 8 − 3 = 10	12 = 8 + 2 + 2

4. Write the missing numerals.

a	b
3 + 6 + 4 = 13	4 + 2 + 6 = 12
2 + 5 + 5 = 12	3 + 3 + 6 = 12
5 + 1 + 8 = 14	3 + 7 + 3 = 13
2 + 7 + 2 = 11	6 + 6 + 2 = 14
3 + 10 + 0 = 13	3 + 5 + 3 = 11

AIMS: Practice number facts; find other names for numbers; add numbers in game situations; add 3 numbers; follow directions; supply numbers that fulfil given conditions.
PROCEDURES: Use as an extension of lessons, independent work, or test of understanding.

PRACTICE (Chapter 7)

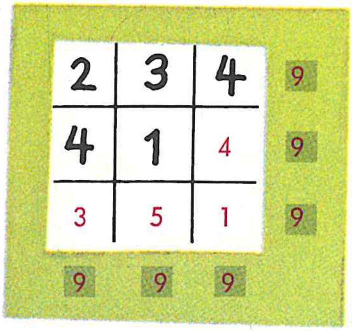
1. Here are many names for only three numbers. What are the numbers? Which names belong to each number?

a. 6 + 4 10
b. 18 − 8 10
c. 2 sixes 12
d. 7 + 7 14
e. 6 + 8 14
f. 18 − 4 14
g. 3 fours 12
h. 9 + 3 12
i. 4 + 10 14
j. 5 + 7 12
k. 3 + 7 10
l. 2 fives 10
m. 4 + 8 12
n. 19 − 5 14
o. 18 − 6 12

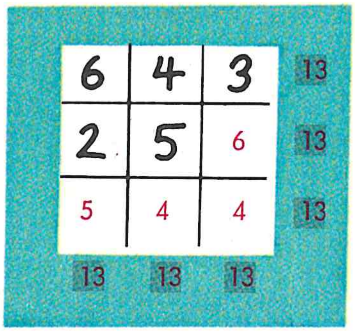
2. What are these three numbers? Which names belong to each number?

a. 14 − 5 9
b. 2 sixes + 1 13
c. 4 + 9 13
d. 16 − 7 9
e. 3 + 8 11
f. 14 − 1 13
g. 6 + 3 9
h. 10 + 1 11
i. 0 + 9 9
j. 2 + 7 + 4 13
k. 2 + 3 + 6 11
l. 12 − 3 9
m. 6 + 7 13
n. 15 − 4 11
o. 16 − 7 9

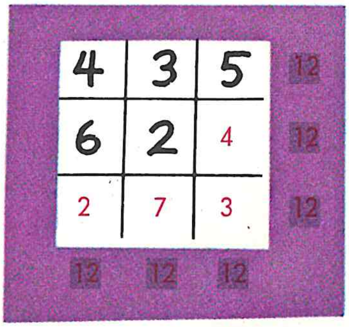
3. For each example, find the sum for the first row. Find the missing numbers so all the sums will be the same.



2	3	4	9
4	1	4	9
3	5	1	9
9	9	9	



6	4	3	13
2	5	6	13
5	4	4	13
13	13	13	



4	3	5	12
6	2	4	12
2	7	3	12
12	12	12	

AIMS: Add by endings; add and subtract 2-digit numbers; use number line to find sums or differences in other decades; understand adding zero.
PROCEDURES: Use as an extension of lessons, independent work, or test of understanding.

PRACTICE (Chapter 8)

Watch the signs. Use the number line if you need it.

1.	52	44	61	15	45	36
	+ 7	+23	+ 7	+42	+ 4	+ 3
	59	67	68	57	49	39
	53	64	50	41	35	61
	+32	+14	+ 9	+ 4	+63	+25
	85	78	59	45	98	86

2.	57	25	64	47	69	48
	− 3	− 3	−13	−22	− 3	−12
	54	22	51	25	66	36
	36	57	68	35	79	25
	− 3	−44	− 2	−24	− 7	− 5
	33	13	66	11	72	20

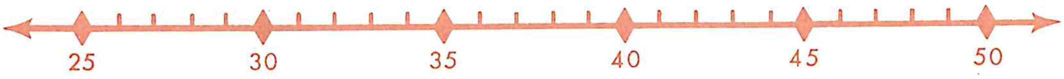
3. Write the missing numerals.

a. 77 − 66 = 11
88 − 77 = 11
99 − 88 = 11
85 − 75 = 10
75 − 65 = 10

10

b. 37 + 0 = 37
45 + 0 = 45
0 + 68 = 68
35 + 0 = 35
47 + 0 = 47

13
54



INDEX

Addition
  by endings within decade, 12, 14, 50, 96; sums in next decade, 133, 138, 153
  checking, 9, 28, 163
  column, 9, 25, 28, 163; horizontal 9, 25, 28, 64, 163
  development of operation
    ones to tens, 12, 13, 91, 104; tens to tens, 30, 46, 50, 95; tens to hundreds, 30, 95; 2-digit addends without renaming 65, 78; 3-digit sums, 65, 95, 99, 153
  facts, see facts, number
  relationship to multiplication, 132; to subtraction, 3, 5, 46, 70
  zero in 28, 43
Additive subtraction, see missing addends
Arrays, 24, 26, 29, 41, 90, 114
Associative property, 68, 69

Calendar, dates, days, months, weeks, 27, 149
Checking addition, 9, 28, 163
Circle, 52, 153
Commutative property of addition, 13, 105; of multiplication, 24, 115, 165
Counting, by 2's, 26, 108; by 3's, 26, 110; by 4's, 108; by 5's, 6, 71; by 10's, 6, 71

Days of week, 27, 149
Difference, 20, 66; readiness for, 13
Directions, (North, South, East, West) 44, 45, 150
Distributive property, 132
Division facts, see facts, number
Doubles, near doubles, 35, 36, 92
Dozen, 23, 57

Enrichment pages, 21, 41, 61, 82, 103, 125, 146, 174
Even and odd numbers, 7, 8, 41

Facts, number
  addition and subtraction, sums and minuends eight-eleven, chap. 1, 2-5; nine-twelve, chap. 2, 22-3; ten-thirteen, chap. 3, 42-3; eleven-fourteen, chap. 4, 62-3; twelve-fifteen, chap. 5, 83-4; thirteen-sixteen, chap. 6, 104-5; seventeen-eighteen, chap. 7, 126-7
  multiplication and division, twos, 24, 26, 29, 41, 90, 109, 114, 115, 165; threes, 24, 26, 29, 41, 90, 98, 110, 114, 116, 165; fours, 24, 26, 29, 41, 89, 109, 114, 115; fives, 24, 41, 50, 87, 90, 98, 114, 131; sixes, 24, 50, 87, 114, 116, 165; sevens, 87; eights, 106, 114, 115, 165; nines, 116, 165; tens, 31, 98, 131

Facts, mastery tests (Do You Know?) 19, 39, 40, 60
Feet (foot), 6, 117
Fractions, 108, 128, 129, 167, 168, 169
Frames, 3, 17, 58, 61, 63, 68, 148

Generalizations, zero and one, 43
Geometry figures, 52, 53, 54, 55; terms, 52, 53, 54, 55

Half, (halves), dollar, 74; fraction, 108, 128, 167, 168, 169
Hand symbols, for five, 10; for ten, 11; for one hundred, 151
Hundred(s), chart 30, 46, 97; symbol, 151; understanding, 30, 31, 33, 152

Identity element, 43
Inch, inches, 117
Inequalities, 77, 155
Inverse operations, addition and subtraction, 3, 5, 46, 70, 153

Measures, linear, 6, 117, 118; liquid, 106; time, 135, 136, 137; calendar, 27, 149; weight, 78, 108
Missing addends, 3, 5, 6, 7, 10, 17, 23, 27, 34, 35, 62, 63, 69, 77, 92, 110
Money, change, 75; chart of values, 156; coins, 71, 73, 74, 75; counting, 71, 72, 73, 88; related to operations, addition, 71, 72, 73, 75, 85, 88; division, 157; multiplication, 75, 85, 157; subtraction, 72, 73, 85, 88, 157
Multiplication, see facts, number
Number facts, see facts, number

Number(s)
  even and odd, 7, 8, 41
  lines, 48, 51, 61, 120, 121, 130, 133
  literal, 62, 63, 82

Number(s) — Continued
  ordinals, 17, 27, 149
  other names for, 119, 127, 147
  place value, 33, 97, 99, 152
  sentences, 3, 17, 18, 63, 77
  sequence, 6, 71, 151
  2-place numerals for, 11, 12, 13, 14, 15
  3-place numerals for, 30, 31, 33
Number system 6, 12, 13, 17, 27, 30, 33, 43, 46, 68, 69, 105, 149, 151
Number words, 12, 31, 94, 112, 113, 151
Numerals, expanded, 30, 33, 95, 97, 151; reading, writing, 12, 31, 33, 94, 97, 112, 113, 152, 153; sequence, 6, 151
Numeration, 15, 46, 94, 97, 130

Odd numbers, see even and odd
One-to-one correspondence, 22, 24, 25
Open sentences, 3, 17, 42, 49, 58, 62, 63, 69, 148
Operations, see addition, subtraction
Ordinals, 17, 27, 149

Place holders
  frames, 3, 17
  literal numbers, 62-3, 82
Place value 33, 97, 99, 152
Practice: exercises 16, 32, 35, 50, 51, 70, 84, 93, 96, 99, 119, 120, 139, 162, 163, 175-186
Problem solving
  analysis, 140, 141, 142
  practice, 85, 88, 107, 121, 157-161, 174

Renaming numbers, see numbers, other names for

Quarter, money, 74; fraction, 108

Rational numbers, see fractions
Rectangle, 52, 53
Remainder, 41, 89, 90
Review (Do You Remember?), 39, 59, 79, 100, 122, 143, 170
Ruler, 6, 117

Scale, 78
Sets
  empty, 25, 28, 63
  set braces, 49, 59, 148, 155
  using sets and subsets, 2, 25, 29, 37, 62, 83, 89, 148
Signs, equal, 77; unequal, 77; greater than, 117; less than, 117
Square, figure, 52, 53, 54, 55; measuring with a, 56
Subtraction
  by endings within decade, 14, 15, 66, 73; answers in next lower decade, 134
  development of operation
    tens from tens, 31, 46, 67, 73, 95
    tens from hundreds, 95, 96, 99, 153,
    2-digit from 2-digit, no renaming, 67
    2-digit from 3-digit, no renaming, 95, 96, 99, 119
  difference, 20, 66
  facts, see facts, number
  relationship to addition, 70; to division, 166
  subtracting ten, 104; to get ten, 104, 111
  successive, 48, 51
  zeros in, 43
Subtraction facts, see facts, number
Symbols, hand, for five, 10; for ten, 11; for one hundred, 151

"Teen" numbers, 12, 13
Ten-by-ten charts, 30, 46, 97, 131, 152
Tens, adding, 30, 46, 50, 95, 99; subtracting, 31, 46, 67, 73, 99; multiplying, 98, 131; adding to get ten, 133; subtracting to get ten, 104, 111
Tests (Do You Know?),
  end of chapter, 19, 39, 60, 80, 101, 123, 144, 172
  end of term, 172, 173
  mastering of facts, 19, 39, 40, 60
Time, 135, 136, 137
Triangle, 52, 53

Variables, open sentences, 3, 17, 64; literal numbers, 62, 63, 82
Vocabulary, 20, 77, 106, 118, 128, 157
  see also number words

Weight, 78

Yard, 6, 118
Yardstick, 6

Zero
  in addition, 25, 28, 43
  in subtraction, 43

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